

HISTORY OF THE  
PACIFIC OCEAN DIVISION  
CORPS OF ENGINEERS  
1957--1967



FORT ARMSTRONG  
HONOLULU, HAWAII  
1 JANUARY 1972

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# **HISTORY OF THE PACIFIC OCEAN DIVISION CORPS OF ENGINEERS 1957--1967**

by

Ellen van Hoften

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FORT ARMSTRONG  
HONOLULU, HAWAII  
1 JANUARY 1972



PACIFIC OCEAN DIVISION

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## FOREWORD

The Pacific Ocean Division, second youngest in the U.S. Army Corps of Engineers organization, is completely unique. Stretching across six time zones and the International Date Line, it spans the Pacific from the Hawaiian Islands to the Asiatic mainland. Although its tenure has been relatively short, its accomplishments have been many. This history attests to that fact.



GEORGE B. FINK  
Brigadier General, USA  
Division Engineer



## PREFACE

Because the Pacific Ocean Division has operated entirely outside the continental United States, its history has developed differently from that of most other Divisions in the Corps of Engineers. Among the results of POD's unusual position in the Pacific are variety and challenge, two themes which run throughout the following chapters. The history of POD falls into two sections: Part One, *The First Decade*, describes the establishment and changing mission of the Division, some of the major projects designed and constructed by POD's three Districts, and important administrative changes occurring between 1957 and 1967. Part One thus serves as background for Part Two, *POD in Perspective*, which focuses on the Division's distinctive position in the Pacific. The unusual geographic conditions found within POD's area of jurisdiction, the nature of operating in foreign lands as well as in U.S. possessions, and the Division's presence in areas of vital significance for U.S. foreign policy have all contributed to the diversity and challenge of POD's history.

Part Two's discussion of these three factors and Part One's presentation of POD's projects together give an overall view of the Division's first decade. Leaving detailed descriptions of the projects to the histories of the three Districts themselves, Part One attempts instead to provide a general picture of POD's work as a prelude to the analysis offered in Part Two. Similarly, the text usually uses ap-

proximate rather than exact cost figures to indicate the relative importance of the Division's projects. The same applies to the history's use of mileages, lengths of time, and physical dimensions.

Other points worth noting here include the many references to the fiscal year 1968 Supplemental Military Construction Program (68-S). Although the Division's first decade actually ended on 30 June 1967, the subsequent 68-S program has had a significant effect on POD's workload and vividly illustrates many of the characteristics of design and construction which are discussed in Part Two. Throughout the history certain geographic terms are used almost interchangeably. "Hawaii" and "the Hawaiian Islands" both refer to the same island chain, with the island of Hawaii usually singled out as such. Unless otherwise specified, construction sites in the Territory or State of Hawaii are located on the main island of Oahu. In the same way, "the Ryukyu Islands," "the Ryukyus," and "Okinawa" all indicate the same group of islands, and most construction there has taken place on the principal island of Okinawa. "Kwajalein" and "the Kwajalein Atoll" likewise are used interchangeably unless the island of Kwajalein is singled out. Many policies pertinent to work in Kwajalein apply as well to activities in all the Marshall Islands, which include other POD construction sites as well as the Kwajalein Atoll. Thus discussions of work in Kwajalein may include references to

the Marshall Islands as a whole. Even broader policies may apply to the Trust Territory of the Pacific Islands (TTPI). All references to “Korea” are to the Republic of Korea (ROK).

The maps distributed throughout Part One indicate the Pacific Area in which POD operates and the locations of major projects within each of the three Districts. Included in the appendices are lists of the Division and District Engineers and five Division organization charts. This material and the information presented in Part One will aid in interpreting Part Two’s analysis of the challenges met by the Pacific Ocean Division in the first ten years of its history.

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**PART ONE:**

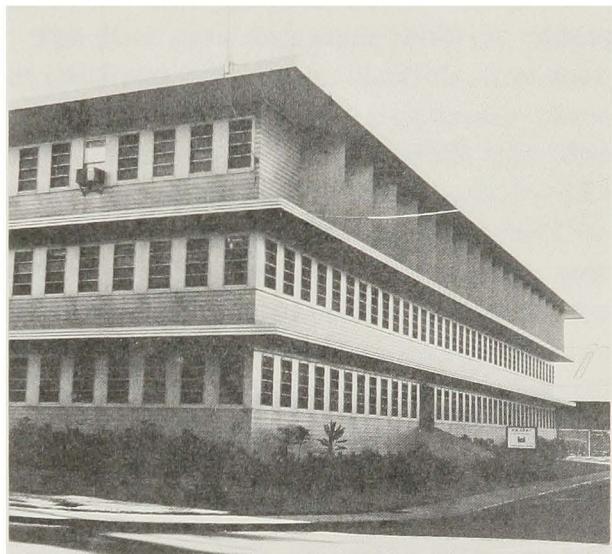
**THE FIRST DECADE**

## INTRODUCTION

Even at the time of its establishment in 1957, the Pacific Ocean Division experienced considerable variety, for the Division's three Districts were each of a different background. Oldest of the three, the Honolulu Engineer District (HED) had just finished its 52nd year in the Corps of Engineers and already occupied offices at Fort Armstrong, where POD would also be headquartered. The Okinawa Engineer District (OED) had been established over a decade earlier and in 1957 was operating under a local Army command rather than under the Corps of Engineers. The new Far East Engineer District (FED), born only the year before, became POD's youngest District.

The rapidly changing jurisdictions and assignments of these three Districts over the past ten years have continued to present the Pacific Ocean Division with a varied assortment of tasks. The broad spectrum of organizations for whom POD has supervised design and construction has included agencies of the U.S. Army, Air Force, Navy, and Coast Guard; the United States Civil Administration of the Ryukyus (USCAR); the State of Hawaii; and the Republic of Korea. Likewise, the Districts' projects themselves have been varied in nature. Housing construction has included Capehart units in Hawaii, trailer sites at Kwajalein, and prefabricated homes in northern Japan; missile facilities have ranged from Nike-Zeus and Nike-X projects at Kwajalein to Hawk sites on Okinawa, Korea and Taiwan. Much of POD's work has been related to water, yet even here the jobs have been diverse: small boat harbors on Hawaii's outer Islands, beach erosion protection at Waikiki, reservoirs and dams in Okinawa, water wells in Korea, and mooring facil-

ties throughout the far east. Other unusual projects have involved a bascule bridge in Hawaii and intricate radar facilities on Kwajalein; electric power plants and a dependents' high school on Okinawa; ammunition storage units and a 250-mile pipeline in Korea; and the conversion of barracks to hospitals plus the completion of ship-to-shore facilities in Japan.



Pacific Ocean Division headquarters at Fort Armstrong, Honolulu, Hawaii.

Supervising this variety of work throughout the Division has required both a wide range of technical capabilities and great flexibility in the area of administration. Among the techniques POD has employed to adjust to fluctuating workloads have been transfers of personnel, relocations of various offices, and mergers of certain functions within the Division. In the establishment of POD and in the gradually changing assignments given its three Districts, in the actual projects designed and constructed by HED, OED, and FED, and in the resulting administrative trends of this first decade, the history of the Pacific Ocean Division has been characterized by great diversity.



## CHAPTER I: A Division Is Born

With the establishment of the Pacific Ocean Division in June of 1957 a new era in Pacific construction began. Although POD's area of jurisdiction has expanded as her three Districts have acquired new clients and additional jobs, the Division's responsibilities and mission have remained basically the same. Her first decade has been marked by participation in a wide range of construction activities for a variety of customers throughout the Pacific.

POD's mission and organization have resembled those of any other Corps of Engineers Division. As an administrative arm of the Corps, the Division extends into operating areas for the purpose of supervising subordinate offices, the Districts. The Division's supervisory responsibilities include the review and approval of its Districts' major plans and programs and the transmission of these to the Chief of Engineers; the interpretation of the Chief of Engineers' plans and policies and their transmission to the Districts; and the review and control of specified individual acts of the Districts. Thus the Division Engineer is directly responsible in the chain of command to the Chief of Engineers. By assigning missions to its Districts, the Division carries out its responsibilities to the Corps.<sup>1</sup>

POD's creation coincided with the relocation of U.S. Army and Air Force Pacific command headquarters from Japan to Hawaii, for the reorganization and transfer of the U.S. Army, Pacific (USARPAC) and the Pacific Air Force (PACAF) required a coordinated and flexible construction capability in the Pacific. To that end, the Office of the Chief of Engineers (OCE) issued General Order No.

11 on 3 June 1957, establishing the new Pacific Ocean Division with headquarters in Honolulu, effective that date. Brigadier General Ellsworth I. Davis would be the first Pacific Ocean Division Engineer. The same General Order also designated the three Districts to be placed under POD's jurisdiction and dated their establishment or reassignment as of 1 July 1957.

The Honolulu Engineer District, oldest of the Division's three Districts, had been a part of the Corps of Engineers since 1905. From then until 1946 HED operated under the Pacific and the South Pacific Divisions in California; in 1946 the District shifted to the jurisdiction of the new Western Ocean Division; and in 1950 the Honolulu office became an Engineer Area of the San Francisco District. General Order No. 11 thus reestablished the unit as the Honolulu Engineer District and placed it under POD.

Until World War II, HED's projects had focused on civil works in the Hawaiian Islands. During the Second World War the District acquired construction responsibilities for the Air Corps and the Army and played a major role in the Engineers' Pacific war effort. The emphasis on military construction continued after World War II, primarily because of the many U.S. forces permanently stationed in Hawaii. HED retained its rivers and harbors projects, however, and has remained the only District in POD with civil works responsibilities. At the time of its reestablishment as a District and its assignment to POD, the Honolulu Engineer District was in charge of military and civil works in the Hawaiian and Johnston Islands.

Like HED, the Okinawa Engineer Dis-

trict had served previously in the Corps of Engineers. Established on Okinawa in 1946, OED was under the Western Ocean Division until 1949, when it was transferred from the Corps and placed under the Far East Command (FEC) in Japan. The District then operated under FEC's successor organization, U.S. Army Forces, Far East/Eighth Army (Rear) until 1957; General Order No. 11 reassigned OED to the Corps of Engineers as part of the Pacific Ocean Division.

During its first few years, the Okinawa District relied primarily on cost-plus-fixed-fee contracts. As local contractors gained more construction experience after 1950, the District gradually shifted to the use of competitively let fixed-price contracts. Developing local contractor capability was thus an important goal of OED's early operations. At the same time, the Okinawa District aimed at rebuilding war-torn U.S. facilities on the island to make Okinawa a modern, habitable duty post. Still responsible for military construction in the Ryukyus and Taiwan, OED would continue to assist the local economy under the new Pacific Ocean Division.

Youngest of the three Districts assigned to POD in 1957 was the Far East District. Established in Seoul on 15 October 1956 as the Korea Construction Agency (KCA) and redesignated on 29 December 1956 as the U.S. Army Construction Agency, Korea (USACAK), the office operated under the same parent command as did OED at that time: U.S. Army Forces, Far East/Eighth Army. FED's transfer to the Pacific Ocean Division in July 1957, then, marked the District's initial assignment within the Corps of Engineers.

Soon after FED's establishment as KCA, Army engineers realized the advantages of assigning the agency to the Corps of Engineers. The post-1953 decision to sta-

tion U.S. forces in Korea had called for the construction of permanent troop facilities; now in 1956 planners envisioned an annual program of over \$25 million and concluded that this would be handled best by a centralized agency with both contracting authority and responsibility for planning and design. Placing such responsibility with the Corps of Engineers also would leave Engineer troops free for combat duties and would help stimulate the Korean economy by providing experience for local contractors. Furthermore, as an Engineer District the Korean construction agency would be able to draw on the personnel, procedures, and organization of the entire Corps and through a Rear Office could supervise military construction in Japan as well as in Korea. With these considerations in mind, effective 1 July 1957 the Chief of Engineers redesignated USACAK as the Far East Engineer District and assigned it to POD.

Thus each of the new Division's Districts came to POD with its own history. HED's 52-year old roots lay in civil works as well as in military construction; the Okinawa District had served under theater commands as well as in the Corps of Engineers; FED had been created only months earlier as KCA. This same diversity has continued as a hallmark of POD's history, for the decade between 1957 and 1967 has seen the three Districts acquire new tasks within expanded jurisdictions which have affected the mission of POD.

Some of the most significant changes in the Division's responsibilities have been those involving the Honolulu District, which in July 1957 was in charge of civil and military construction only in the Hawaiian and the Johnston Islands. In December of that year HED's jurisdiction was enlarged to include the Line, Gilbert, and Marshall Islands plus Midway and

Wake. Even after 1964, when HED's boundaries were redrawn, the District retained responsibility for civil and military construction in Hawaii and the Marshall Islands, and in the meantime, in January 1963, acquired certain civil works duties in Guam.

During these years the District's real estate role was also reassessed. HED had serviced the real property needs of the Army and Air Force in Hawaii since World War II; now, with its new construction duties in the Trust Territory of the Pacific, the District also began real estate activities in the Marshall Islands. 1962 then saw the merger of the District's real estate functions with those of the Division, as discussed in subsequent sections of this text. The remainder of this history will also reflect the significance for the Division of HED's December 1957 assignment as military construction agent for the Marshall Islands. While POD's activities during the past decade have ranged all over the Pacific, a considerable portion of the Division's workload since 1959 has involved Nike research and development projects located in the Kwajalein Atoll and supervised by HED's Kwajalein Area Office. The expansion of HED's jurisdiction to the Marshall Islands in 1957 heralded POD's entry into an important new area of military construction.

Whereas the Honolulu Engineer District saw several important changes in its jurisdiction between 1957 and 1967, the Engineer office in Okinawa maintained basically the same functions during those ten years. OED has handled military construction in Okinawa and Taiwan not only for the U.S. Army and Air Force, as in Hawaii, but also for the Navy, and the Marine Corps. In addition, the Okinawa District has provided design and construction services to certain Federal agencies

such as the State Department and, most importantly, the U.S. Civil Administration of the Ryukyus. This unusual situation had distinguished OED, and hence POD, from other units of the Corps. Similarly, as agent for the High Commissioner (HICOM) of the Ryukyu Islands, the District has handled real property acquisition, management, and disposal for all U.S. forces in Okinawa. While OED has had no real estate responsibilities in Taiwan, it has maintained operational control of the Taiwan (later Taipei) Area Office (TAO) located at Taipei. Since its establishment in 1955, TAO has been attached to the Military Assistance Advisory Group (MAAG) in Taiwan and has acted as OED's Contracting Officer's representative on OED projects executed in Taiwan.

Supervising military construction in the Ryukyus and Taiwan for U.S. military forces and for USCAR and acting as real estate agent for the High Commissioner of the Ryukyu Islands, then, have constituted OED's major activities during the past decade. Those same years have seen the Far East District's duties fluctuate in a manner similar to HED's. At the time of its establishment, most of FED's work involved construction in Korea: Military Assistance Program (MAP) and Military Construction Army (MCA) funds financed facilities for the Eighth Army, while additional work included family housing for the Provisional Military Assistance Group in Korea (PROVMAAG-K) and for the Office of the Economic Coordinator (OEC). The Japan Area Office established near Tokyo on 1 July 1957 handled the few U.S. Army projects constructed in Japan during FED's first two years.

Personnel attached to the Japan Area Office then formed the nucleus of the Far East District (Rear) office which was

established near Tokyo in 1959. At the same time, the District's Engineering Division moved from Korea to Japan to take advantage of Japanese engineering talents and to offer longer tours of duty to U.S. engineers. These organizational changes, discussed further in Chapter Three, set the scene for the increase in FED's activity in Japan after 1963.

Contributing to that increase was the designation of the Far East District as design and construction agency for the Department of Defense (DOD) in Korea and Japan. Effective 1 July 1963, this assigned FED responsibility for Air Force and Navy construction as well as for Army projects in both countries. Since the Air Force and the Navy operated a considerable number of facilities throughout Japan, FED soon saw the bulk of its workload shift from Korea to Japan. Even since 1968, when the workload in Korea increased because of the 1968 Supplemental Program, the District has continued to construct a variety of facilities in Japan for all the military services.

FED's real estate activity has been limited to Korea, just as OED's duties in that field have been restricted to the Ryukyu Islands. On 1 July 1958 FED was assigned responsibility for the acquisition, inspection, and release of real estate in Korea and was to serve as liaison with the Korean Government in real estate affairs. As discussed in Chapter Four of Part Two, these duties remained in the hands of the District until the fall of 1969, when they were reassigned to the Eighth U.S. Army. During most of the Division's first decade, then, FED managed real estate in Korea as well as military construction in both Korea and Japan.

The Far East District's work in these areas has contributed to the assortment of tasks supervised by POD. The respon-

sibilities of each of the Division's three Districts have been as varied as their backgrounds: HED has handled not only military construction for the Army and Air Force but also civil works; OED has serviced USCAR instrumentalities; FED has managed military construction projects for a variety of agencies in two major countries of Asia. As a result of the Districts' assignments, principal clients of the Pacific Ocean Division have included such diverse agencies as the Safeguard Systems Command and the State of Hawaii; USCAR and the Agency for International Development (AID); and major units of the Army, Air Force, and Navy. During its first decade POD has overseen building in the Hawaiian Islands, the Trust Territory of the Pacific Islands, Okinawa, Taiwan, Korea, and Japan; has been responsible for real estate activities in all but Taiwan and Japan; and has executed the Chief of Engineers' civil works mission in Hawaii. Directing projects for such a variety of using agencies throughout an area encompassing 8 $\frac{3}{4}$  million square miles has led the Division into many different types of construction. The next two chapters in Part One will describe the major projects designed and constructed by POD's three Districts and will discuss resulting administrative changes in the Division's organization. Using this material as background, then, Part Two will consider the challenges these projects have presented to POD because of the unusual characteristics of construction in the Pacific.

## Chapter I

### 1. U.S. Army Engineer Division, Pacific Ocean, Statement of Mission, EM 10-1-12.

Department of the Army, Office of the Chief of Engineers, **Organization and Functions**, ER-10-1-1, 7 January 1969.

## CHAPTER II: The Projects

All of the Pacific Ocean Division's three Districts have supervised a wide range of design and construction projects in varied locations. Each District has been responsible for construction in two distinct geographic areas: the state or country which has housed the District headquarters, and a second region in which projects have been managed through an Area, Project, or Rear Office. Operating in at least six different areas, then, POD has overseen a variety of design and construction tasks.

The projects handled by the Honolulu Engineer District have fallen into two categories, military construction and civil works, and HED's military construction jobs have focused on two island chains, Hawaii and Kwajalein. In Hawaii, much of HED's work for the U.S. Army has consisted of housing and related facilities on Oahu. Between 1957 and 1960 the office spent approximately \$2.5 million for 80 family housing units and a 60-man bachelor officers' quarters (BOQ) building at Schofield Barracks; between 1964 and 1966 the District supervised the construction of an additional 350 units of family housing there costing \$6 million.

Even more dramatic than these quarters was the series of housing projects financed under Capehart legislation and built between 1957 and 1962. During that time over 2,400 units saw completion: the 1,326 constructed at Schofield in 1957, 1958, and 1959 cost \$21.6 million; a similar project of 250 quarters at Tripler Army Hospital and Fort Shafter in 1958 and 1959 cost over \$4 million; and an additional project completed between 1959 and 1962 provided 864 units at Fort Shafter and Schofield Barracks at a cost of \$15.5 million. Among the contractors involved in this

Capehart construction were Robert E. McKee, General Contractors, Inc.; Theo G. Mayer and Sons; and the Hawaiian Dredg-



Capehart housing units built at Fort Shafter, Hawaii, January 1959.

ing and Construction Company.

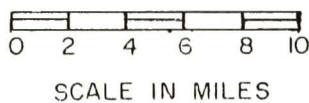
These housing projects called for related facilities at the same Army posts. A \$600,000 chapel at Schofield Barracks completed in 1961, a group of tactical equipment shops built there in 1965 and 1966 for \$1.8 million, and \$150,000 worth of modifications installed at Tripler Hospital in 1961 and 1966 were typical of the facilities built on Oahu by HED in the 1960's. Also included in the District's Army construction program during those years was a Reserve Training Center built at Fort DeRussy in 1960, a similar but smaller center erected on Maui two years later, and a 35-man barracks constructed on Kauai between 1960 and 1962.

The Air Force as well as the Army has hosted HED's military construction projects in Hawaii. Much of the District's work for the Air Force at Hickam Air Force Base took place in three general

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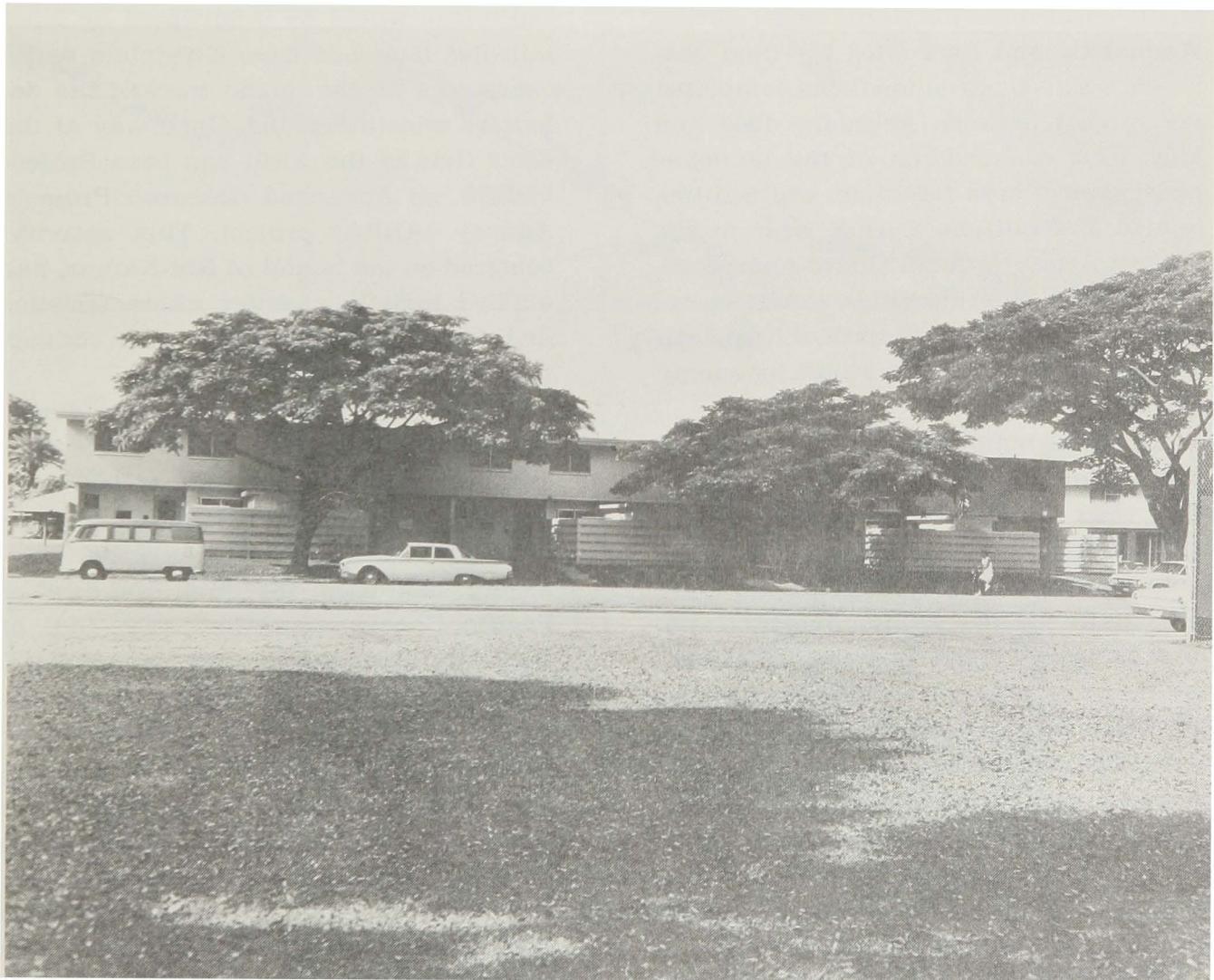
## ISLAND OF OAHU



phases: the first, from 1958 to 1959, included the construction of officers' quarters, technical facilities, and a base chapel with an educational wing. Between 1959 and 1962, HED handled a considerably larger package of Hawaii Air National Guard facilities. Costs of construction of the hangar, apron, and taxiway totaled almost \$2.5 million; principal contractors were the local firms of Robert E. McKee and Nordic Construction; James W. Glover; and Morrison-Knudson. After a few years of relatively little work at Hickam, in 1964 the District reopened its Project Office there and in the next three years contracted for several jobs. A \$435,000 air freight terminal, 250 units of

family housing costing \$4.6 million, and a \$537,000 group of enlisted dormitories all saw construction between 1964 and 1967, while a \$915,000 airmen's dorm was completed in January 1969. Construction at Hickam thus made up a considerable portion of HED's Air Force Workload between 1957 and 1969.

Two other Air Force sites on Oahu, Kaena Point's Satellite Test Tracking Station and Wheeler Air Force Base, also received attention from the District during the decade. Construction at Kaena Point between 1958 and 1968 included several antenna support structures and an administration building; the ten-year program ran to over \$1.5 million in building costs.



Family housing constructed at Hickam Air Force Base, Hawaii, 1966.

At Wheeler, contractors completed a small lighting installation project in 1966 while the Honolulu firm of Hogan and Chapman designed a chapel and annex for the base. Finished in 1968, the \$359,000 chapel at Wheeler won the Chief of Engineers' honorable mention architecture award in 1969.

In addition to these support facilities at the islands' Army and Air Force bases, the Honolulu District also played an important role in American defense by supervising the construction of six Nike-Hercules batteries at various sites on Oahu. On the basis of an extensive planning report by the Real Estate Division, in 1957 the District selected Kahuku and Mokuleia on the north shore for single batteries and Waimanalo and Ewa sites for dual batteries. Local construction firms completed the project between February 1960 and May 1962; construction of the launcher pads, control area facilities, and utilities totaled \$8.4 million. Turned over to the Hawaii Army National Guard upon completion, the Nike-Hercules facilities represented a significant aspect of American defense against possible attack by enemy planes.

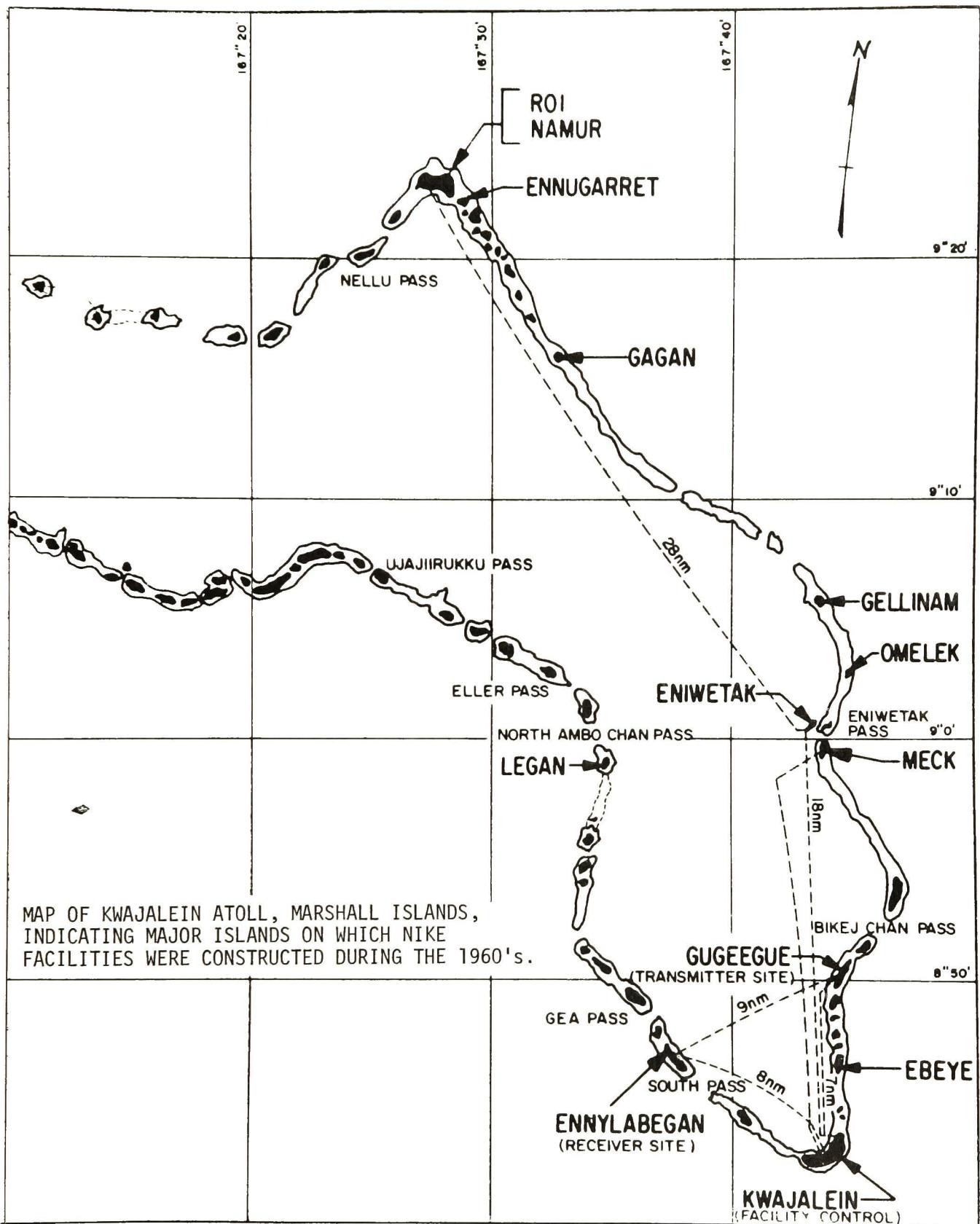
Among the major military projects constructed in Hawaii between 1957 and 1967, then, were these Nike-Hercules batteries on Oahu. Additional work in the islands included housing units and related structures built for the Army, quarters and other buildings erected for the Air Force, and facilities constructed for the Hawaii Air National Guard. While HED managed these varied projects in Hawaii, the District also supervised construction for an important anti-missile testing program in the Marshall Islands. The decade saw the energies of the Honolulu District focused on both Hawaii and the Kwajalein Atoll.

The anti-ballistic missile (ABM) research

and development program at Kwajalein began in 1959 as Nike-Zeus. It was succeeded in 1964 by Nike-X, was renamed the Sentinel System in 1967, and has been known more recently as Safeguard. Sponsorship meanwhile has shifted from the U.S. Army Rocket and Guided Missile Agency to the U.S. Army Material Command, then to the Sentinel System Command, and later to the U.S. Army Safeguard System Command (SAFSCOM). In spite of these changes the program's goal has remained the same: the research and development of anti-missile missiles as part of America's system of defense.

Under the Nike testing programs, intercontinental ballistic missiles fired from California would be intercepted by Nike missiles launched from Kwajalein while computers on the island tracked the defensive missiles' paths. Underway at the same time in the Atoll has been Project PRESS, an Advanced Research Projects Agency (ARPA) project. This activity, centered on the island of Roi-Namur, has studied missile re-entry characteristics and electromagnetic signatures in connection with Nike testing.

HED's role in these research and development programs has involved the construction of the "brick and mortar" portions of Nike and PRESS technical, community, and support facilities. Prime contractor has been the joint venture of Pacific Construction Company, Ltd. of Honolulu; Reed and Martin, Inc. of Fairbanks; and the H. B. Zachry Company of San Antonio (PMZ). In 1960 the other two partners bought out Pacific Construction, and since 1965 the firm has been known as Martin-Zachry Construction (MZC). The contract negotiations between HED and PMZ which eventually assigned most of the District's Nike construction to that joint venture form an interesting part

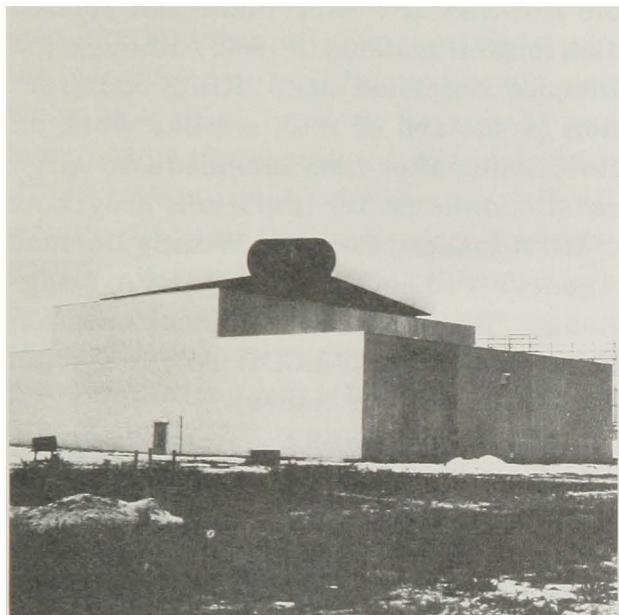




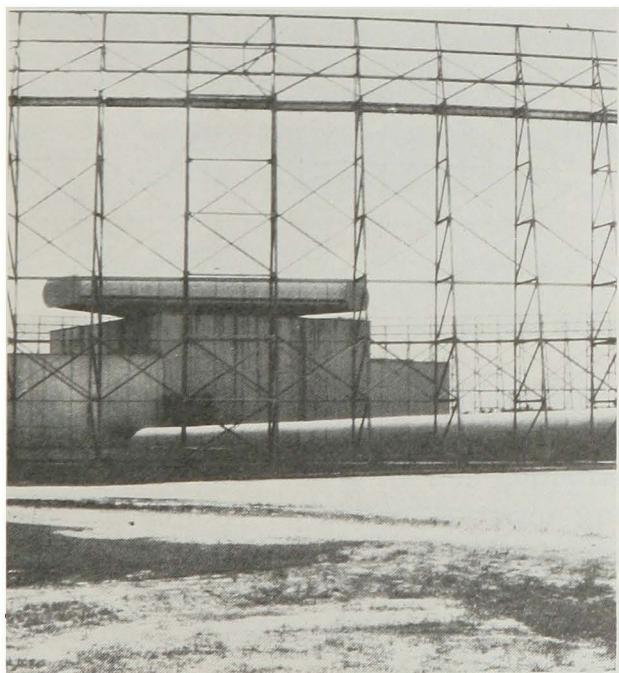
View of launch facilities constructed for Nike-Zeus on the western end of Kwajalein.

of POD's history and will be referred to again in Part Two.

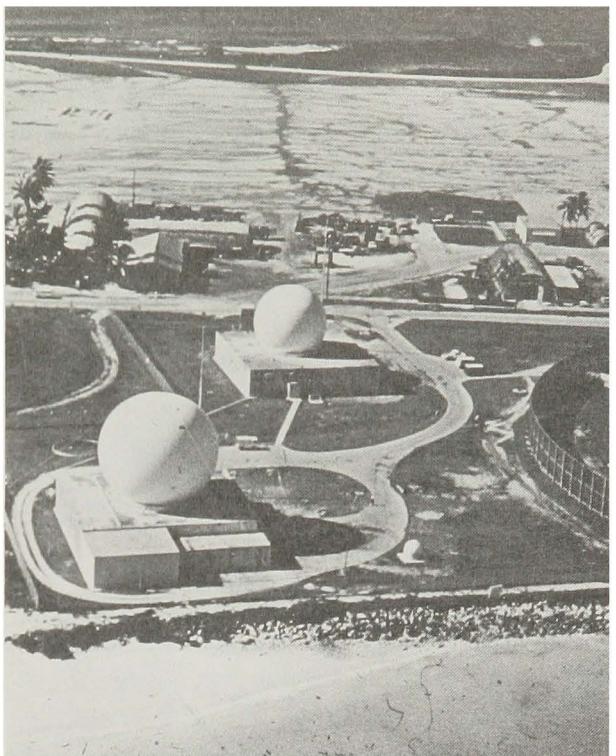
Initial testing plans for Nike-Zeus called for the construction of launch facilities on Johnston Island; before this activity was phased out in Mid-1960, the District supervised dredging and fill operations there which created over 23 acres of new land.



Zeus Acquisition Radar (ZAR) Building, Kwajalein.



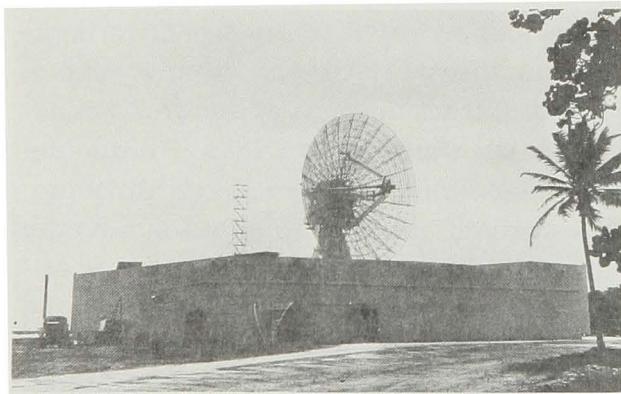
ZAR Radio Frequency Shielding Fence, Kwajalein.



Target Track Radars, Kwajalein.

Construction in the Kwajalein Atoll between August 1960 and late 1961 focused on the Zeus Acquisition Radar (ZAR) complex on the western end of the island. Total construction costs of the ZAR Transmitter building and Radio Frequency Shielding Fence; the Receiver Building; the Receiver Antenna Foundation; and the Power Plant and its facilities were approximately \$11.5 million. Nearby, the Zeus missile complex included four 60-foot deep reinforced launch cells overlooked by TV cameras; two Target Track Radars (TTR's), a TTR boresight tower, and a Discrimination Radar (DR); a Battery Control Building; and the Weapons Battery Power Plant. Completed during 1961 and 1962, construction of these missile facilities cost approximately \$13.2 million. Over \$7.6 million more was spent to construct technical support facilities such as the Joint Technical Operations Building, warehouses, and communication and instrumentation structures.

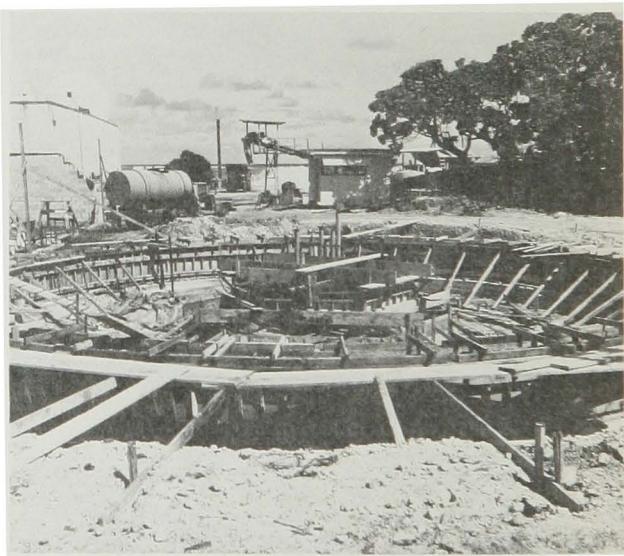
Built concurrently with these technical facilities on the western end of Kwajalein were community facilities located on the eastern half of the island. Dredging and fill operations created 20 acres of new land on which utilities and trailers were installed for a mobile homes park; the contractor erected a complex of bachelor quarters for 500 men; a dependents' school, clubs, and recreational facilities brought the total contract cost of these community structures to approximately \$11.6 million. PMZ also constructed over \$7.2 million worth of Nike-Zeus instrumentation and communication facilities on the Atoll islands of Gugeegue and Ennylabegan and a \$645,000 launch complex for Nike-Zeus's Project "Speedball" on the island of Roi-Namur. Between 1960 and 1962, then, HED supervised the construction of a variety of buildings for the Nike-Zeus research and development program.



TRADEX Building constructed at Roi-Namur, Kwajalein, 1962.

At the same time, a separate contract with PMZ called for construction of facilities for Project PRESS, ARPA's Pacific Range Electromagnetic Signature Studies program. The shipment of supplies to remote Roi-Namur, site preparation, and the reconstruction of the airfield there had to precede more technical construction; support facilities such as the terminal and administration building, housing units,

and a retail store were also required before work on the technical facilities could begin. Most important of these technical structures was TRADEX, the Target Resolution and Discrimination Experiments Radar, which with associated towers and optical facilities was built between 1960 and 1961 for \$3.7 million. Approximately \$3 million was spent on construction of the Roi-Namur Power Plant and related distribution systems in 1962. Although the District completed most PRESS construction by the end of 1962, similar work on Roi-Namur after 1965 included two large radar complexes for important programs of the Advanced Ballistic Missile Defense Agency: Project ALTAIR (ARPA Long-Range Tracking and Instrumentation Radar) and Project ALCOR (ARPA Lincoln C-band Observable Radar).



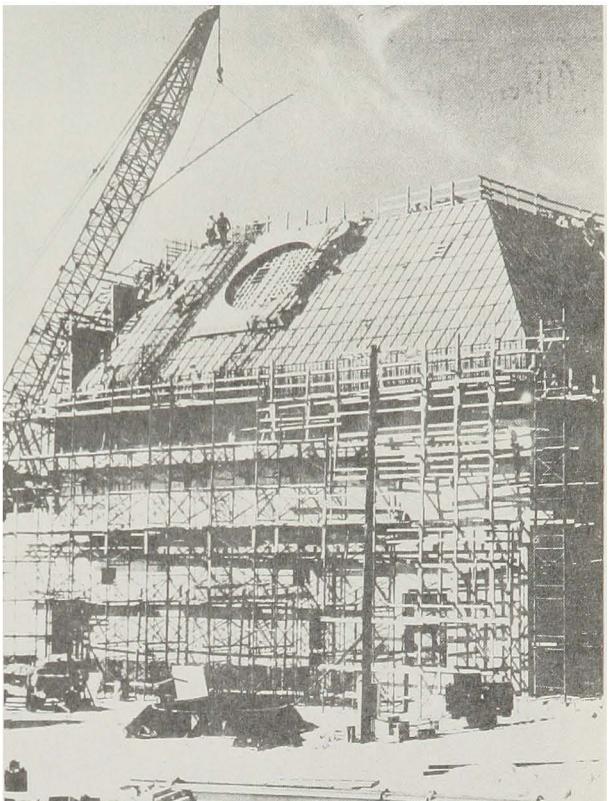
ALTAIR antenna ring under construction at Roi-Namur.

By the middle of 1962, meanwhile, the first increment of Project PRESS construction and all of the Nike-Zeus building program had been completed. The resulting lull in HED's Kwajalein activity lasted less than a year, however, as the Department of Defense began planning in 1963 for Nike-Zeus's successor, Nike-X. In early 1964 PMZ began dredging and

fill operations on both Kwajalein and Meck in preparation for Nike-X construction; in December 1965 the District awarded the joint venture a \$3.7 million contract for Nike-X facilities; by 1 January 1970 Nike-X work had expanded to bring the contract cost of construction to over \$66 million.

Actual construction for Nike-X involved both the building of new structures and the conversion or modification of old, and work took place on both Kwajalein and Meck. Most important of the new facilities erected on Kwajalein for Nike-X was the Defense Center Control Building (DCCB), a reinforced concrete structure located on new fill on the western end of Kwajalein and designed to house a multi-function array radar (MAR II). Construction of the DCCB began in the spring of 1967; subsequent changes in the Nike-X testing program resulted in the building's redesign and ultimately in the termination of the project for which it was intended. Associated structures built on Kwajalein for Nike-X included new Missile Site Radars (MSR's), bachelor quarters, a second mobile home park, and a junior-senior high school complex. At the same time, MZC enlarged two of the Nike-Zeus launch cells and modified the nearby DR and TTR's for use with Nike-X, while the output of the Nike-Zeus power plants on Kwajalein was redirected toward facilities throughout the island.

Paralleling several of the Nike-X facilities planned for Kwajalein Island were similar structures built on Meck. The Meck Island Control Building (MICB), housing a Missile Site Radar, and the 14 million-watt Meck Island Power Plant were both completed in 1968. Construction of a runway, apron, warehouse, and administration building on Meck and work on a Meck Island launch complex also

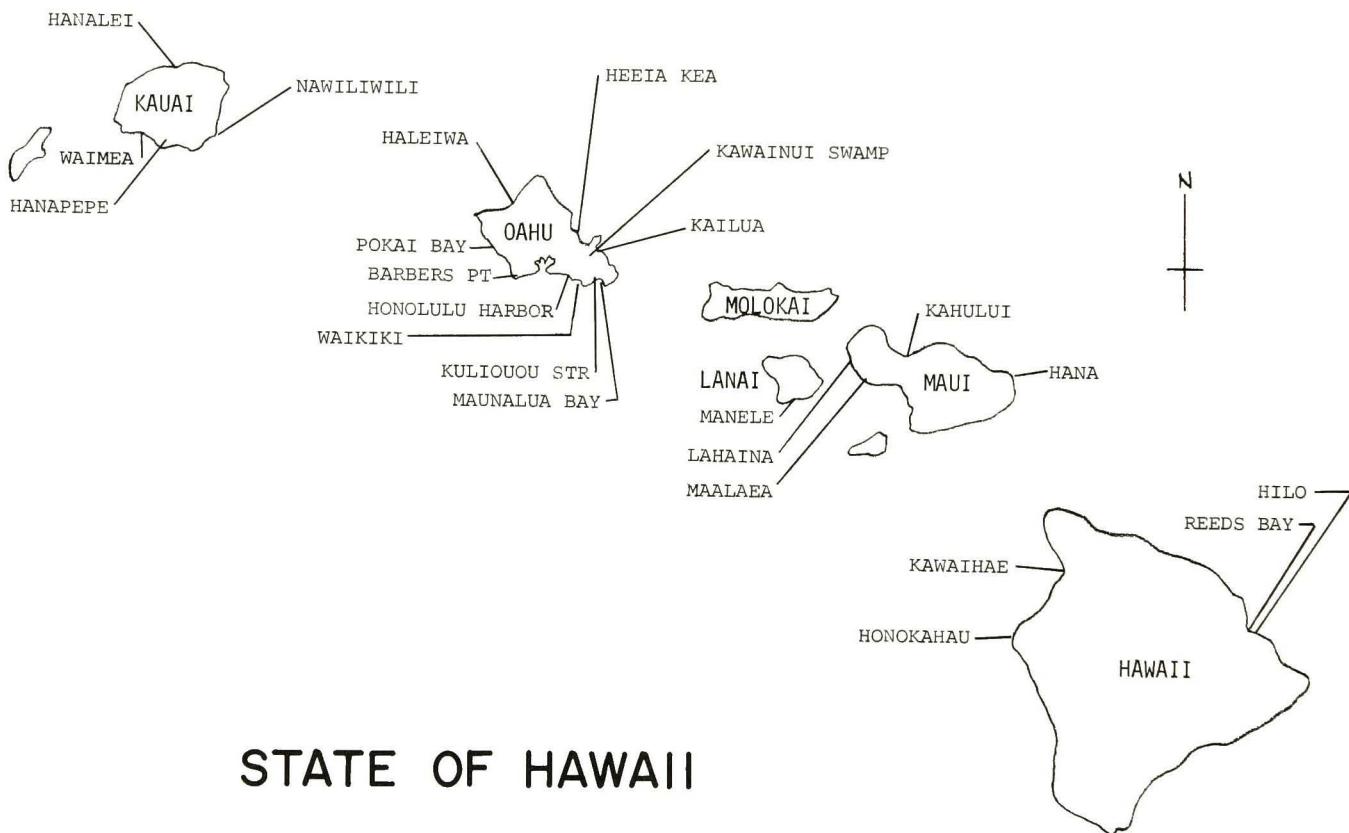


Turret of Meck Island Control Building (MICB) under construction.

marked the gradual shift of Nike-X testing from Kwajalein to Meck at the end of the decade. Safeguard plans formulated since 1969 have included the island of Illeginni, too, where a \$10 million construction program of remote launch facilities is envisioned. In addition, between 1964 and 1967 the District supervised MZC's construction of a housing project on the island of Ebeye. By providing permanent homes for Marshallese evacuated from the Atoll's area of missile operations, these 77 concrete dwellings significantly raised the natives' standard of living. Several islands in the Kwajalein Atoll thus saw construction between 1957 and 1967, although work centered on Kwajalein and Meck. While HED continued to build facilities for the Army and Air Force in Hawaii, the Nike program constituted the bulk of the District's military construction activity during those years.

HED's civil works projects, on the other hand, have been limited to the Hawaiian Islands. Between 1905 and 1957 the District had supervised harbor improvements on Kauai, Oahu, Maui, and Hawaii and had begun studies or preliminary work on small boat harbors, flood control, and beach erosion protection projects throughout the chain. The decade between 1957 and 1967 saw continued activity in all these arenas.

throughout the 1940's and 1950's. Major work on Kauai between 1957 and 1967 focused on Nawiliwili, where the District supervised the reconstruction of the recently storm-damaged breakwater. This project made use of 17.8-ton tribars as components of the rubble-mound barrier; designed by HED civil engineer Robert Q. Palmer, these concrete three-bar structures provided a sturdy substitute for scarce rock. Between 1958 and 1960, 600



## STATE OF HAWAII

Prior to 1957 HED had constructed improvements at the harbors of Nawiliwili and Port Allen on the island of Kauai. Construction of a breakwater and dredging of a harbor basin and entrance channel at Nawiliwili took place between 1919 and 1930, while similar but smaller facilities were built at Port Allen between 1933 and 1935. Maintenance of the harbors and repairs to the breakwaters continued

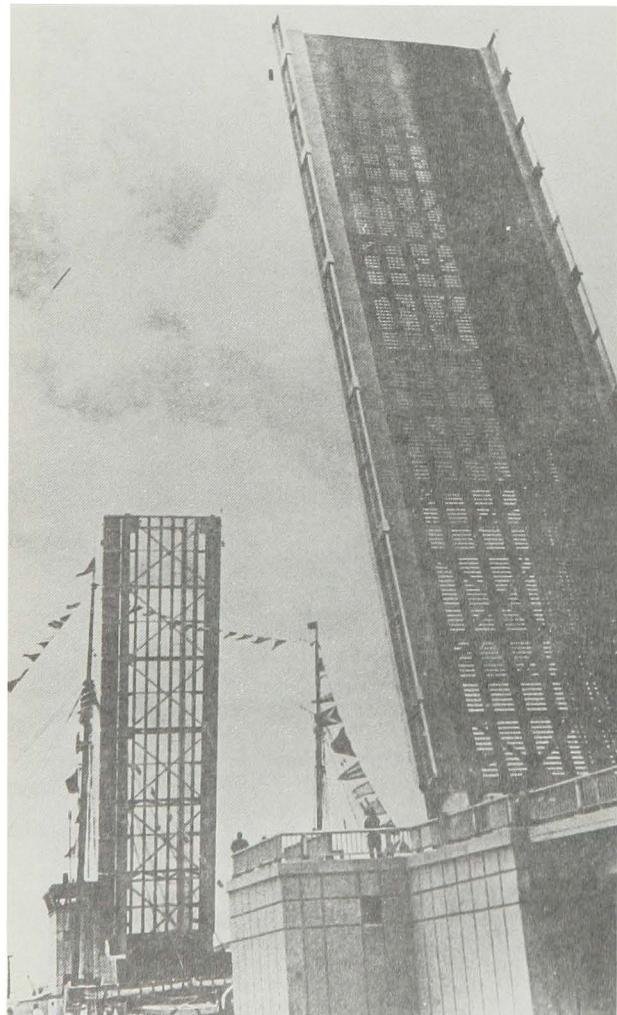
tribars were cast and placed by contract at a total cost of approximately \$992,000. Mr. Palmer soon received both a Federal patent and national recognition for this new feature in breakwater design.

Civil works tasks on Oahu during these years centered on Honolulu Harbor, whose entrance channel, harbor basin, and "reserved channel" for additional wharfage had been developed between 1905

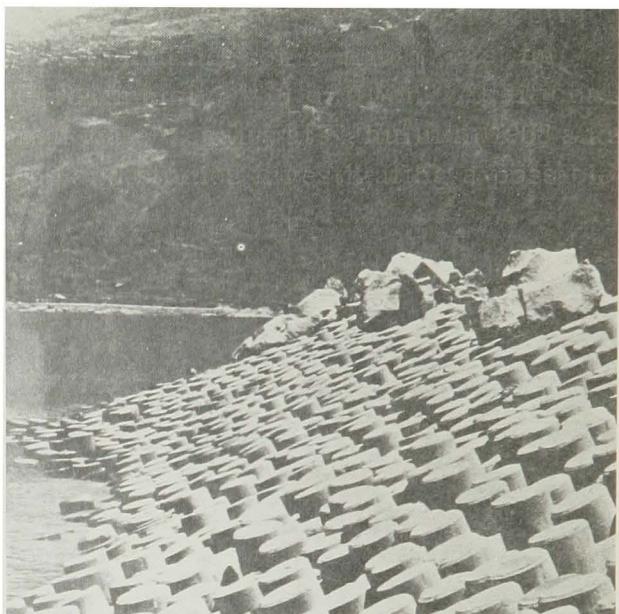


Honolulu Harbor, Oahu, Hawaii, looking southwest, 1970.

and 1935. Maintenance dredging carried out during the century gradually enlarged Sand Island and created even more berthing area in the harbor. The early 1960's then saw the construction of the long-considered "second," "rear," or Kalihi channel at Honolulu. Between 1959 and 1962 contractors dredged this channel to 35 feet and constructed a bascule bridge to span the new entranceway, at a total cost of over \$4 million. Providing this second entrance channel to Honolulu Harbor and thereby facilitating maximum use of the "reserved channel's" wharfage constituted the major navigation project completed on Oahu between 1957 and 1967. Other work on the island included a study of deepening the basin and channels of



Bascule bridge over Kalihi Channel, Honolulu Harbor.



Tribars placed on the breakwater at Nawiliwili Harbor, Kauai, Hawaii.

Honolulu Harbor and an investigation of the possibility of a second Oahu harbor at Barbers Point. Much of the District's civil works activity during this period took place on the island of Oahu.

To the east, Maui also saw Federal harbor improvements between 1957 and 1967. The two breakwaters built at Kahului between 1911 and 1919 had suffered considerable storm damage during the next 40 years, while continued shoaling required frequent maintenance of the harbor. In 1961 and 1962, then, HED enlarged the harbor basin to 35 feet at a cost of approximately \$700,000. Even more significant was the reconstruction of the breakwaters, begun in 1964, for here the District utilized the tribar techniques first employed at Nawiliwili a few years before. Between 1964 and 1966 contractors placed 827 35-ton and 43 50-ton tribars on the east barrier, plus 181 35-ton and 173 50-ton units on the west breakwater, at a total contract cost, including some tribar casting, of approximately \$1.6 million. Additional breakwater repairs at Kahului in 1968 and 1969 and studies investigating a possible

harbor at Maalaea rounded out the District's navigation work on Maui in the 1960's.

Some of HED's most interesting civil works jobs during the decade involved the two major ports on the "Big Island" of Hawaii: Hilo and Kawaihae. At Hilo, the District had dredged a 35-foot harbor basin and constructed a 10,170-foot rubblemound breakwater between 1908 and 1930. While this barrier substantially aided navigation in the harbor, it did not protect against the tidal waves, or tsunamis, to which that coast of the Big Island is particularly prone. The big wave of 1 April 1946 took 96 lives and caused \$30 million worth of damage in Hilo; the tsunami of 23 May 1960 killed 61 and destroyed \$22 million worth of property in the same area. Shortly after this second massive wave, renewed interest in tidal wave protection led to the establishment of the Look Laboratory of Oceanographic Engineering at Honolulu's Kewalo Basin. The laboratory was named for James K. K. Look, the HED civil engineer who lost his life while observing the 1960 tsunami at Hilo Bay.

In 1964 the District completed the 4,000-square foot, \$115,000 Hilo Harbor Bay model to be housed at Look Lab; during the next two years engineers and scientists used this hydraulic model to test various offshore barrier plans for Hilo. The scheme determined most satisfactory in 1965 called for the extension of the existing breakwater to 10,570 feet and the construction of a second barrier on the west.

These improvements were authorized by Congress, but the high estimated first costs of new work (\$43.9 million in 1966) so far has precluded State participation, and the project has been indefinitely postponed. The experiments at Look Lab have lead to similar tests for the proposed Barbers Point harbor; related endeavors at

the lab have produced new knowledge in the area of tidal wave protection; and the hydraulic model constructed there by the District was the first of its kind. The construction and operation of the hydraulic model has thus seen wide application beyond the borders of Hilo Bay.

Equally important during the years from 1957 to 1967 was the development of Kawaihae Harbor as the Big Island's second major port. Authorized by Congress in 1950 and designed by the District within the next five years, this project called for the construction of an entrance channel 400 feet wide, approximately 2,900 feet long, and 40 feet deep. A 4,400-foot breakwater and a 35-foot deep harbor basin measuring 1,250 feet square were also included in the plans. Construction of these improvements took place between January 1957 and October 1959 at a total Federal cost for new work of over \$4.1 million. Thus the only new deep draft harbor built in Hawaii since the 1930's was completed just two years after the establishment of POD.

Additional work at Kawaihae has involved a special project to demonstrate the practical applications of an advanced engineering technique called "row charge excavation." Developed out of a 1965 authorized project to enlarge the main harbor basin and to construct a small boat harbor, "Project Tugboat" has been managed by the Honolulu District Engineer and its operations conducted by the U.S. Army Corps of Engineers Nuclear Cratering Group of Livermore, California. Explosive blasts detonated in 1969 and 1970 created the entrance channel and initial berthing basin of the small boat harbor; subsequent phases of "Tugboat" will complete the small boat harbor project. Activity at Kawaihae as well as studies of tsunami protection at Hilo added Hawaii



"Project Tugboat" blast, Kawaihae Harbor, Island of Hawaii, November 1969.

to the list of islands receiving civil works attention in the 1960's.

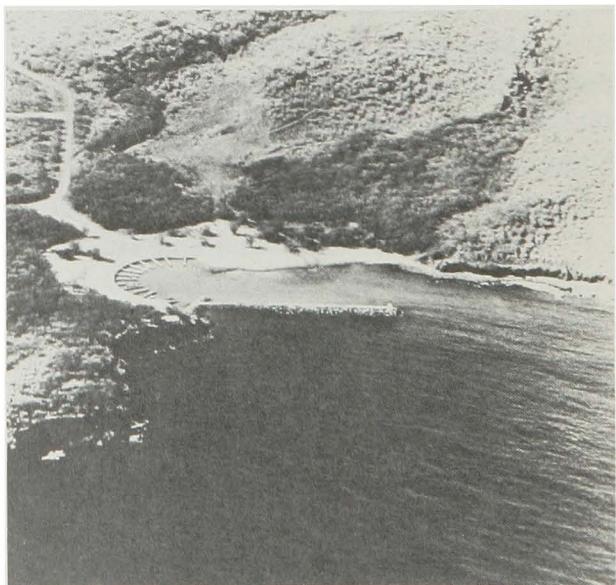
The chain was also the subject of an extensive study of possible small boat harbor sites. Between 1958 and 1962 the District investigated 19 locations on several islands and in 1963 selected nine ports for possible development: Hanalei, Kauai; Pokai Bay, Heeia-Kea, Kailua, and Maunalua Bay on Oahu; Lahaina and Hana, Maui; Reed's Bay and Honokahau in Hawaii. The 1967 final report which climaxed the \$350,000 survey estimated the total cost of constructing these nine harbors plus modifying three State small boat harbors at \$12.3 million. All were authorized, and by 1970 three small boat facilities had been built: at Manele, Lanai, in 1964 and 1965 for \$445,000; at Haleiwa, in 1965 and 1966, with Federal costs of \$295,000; and at Honokahau, between 1968 and 1970, at a Federal cost of \$808,000. The work at Manele and Haleiwa had been studied and authorized separately. Both deep draft and small boat harbor improvements were thus among HED's navigation projects between 1957 and 1967.

In the field of flood control, the District completed works at four island sites. The design memorandum for the Hanapepe River project on Kauai was finished in 1956; levees on both banks of the river

were built for \$588,000 between 1959 and 1966. At Kawainui Swamp on Oahu, HED supervised the construction of a basin, a groin, a revetment, and levees during 1964, 1965, and 1966, with Federal costs totaling \$1.4 million. The contract cost of building channels and levees to divert the flow at Waiooa Stream near Hilo was \$1.1 million; these improvements were built between 1963 and 1965. And a study of Kuliuou Stream on Oahu completed in 1966 led to the construction of flood control measures there, as a \$1.6 million project, between 1968 and 1970.

In addition to navigation and flood control activities, HED handled several beach erosion protection jobs. Most important of these was the project for Waikiki, where between 1951 and 1957 the Territory of Hawaii had placed sandfill to widen the beach and had constructed groins and a terrace wall. In 1960 the District contributed \$214,000 as one-third of the first costs of this Federally authorized project.

A study carried out by HED between 1960 and 1963 resulted in Congressional authorization in 1965 for a new project for Waikiki. The placement of 10,800 linear



Small boat harbor at Manele, Lanai, Hawaii.

feet of new beach and the modification of existing groins would total an estimated \$4.7 million. While awaiting Federal funds, meanwhile, in 1969 and 1970 the District completed the Fort DeRussy portion of the Waikiki beach erosion protection plan with non-appropriated money.

Elsewhere in the islands, in 1964 HED made plans for seawall construction at Waimea and Hanapepe on Kauai. The only other beach erosion protection project completed in the 1960's was that at Haleiwa, Oahu, where the State added 202,000 square feet of beach fill and built a breakwater and a groin in 1965. The District reimbursed the State for 60% of the \$400,000 cost. With these projects for Waikiki, Kauai, and Haleiwa, the Division added beach erosion protection to its list of flood control and navigation tasks. POD's civil works activity, although limited to work in the Hawaiian Islands, has included a wide variety of assignments with an emphasis on harbor improvements.

The civil works projects described above made up a relatively small portion of HED's workload between 1957 and 1967, since most of the District's jobs were in military construction. In fiscal year 1958, for example, the military workload totaled \$19.7 million and the civil workload only \$2.7 million; in fiscal year 1961 the ratio was \$68.2 million to \$1.9 million, and in fiscal year 1966, \$17.2 to \$2.6 million.<sup>1</sup> This distinction between military and civil works construction pertains only to the Honolulu District, of course, since POD's other two Districts have had no civil works responsibilities. In a similar fashion, however, the work of the Okinawa District can be divided into two categories. All of its projects are classified and financed as "military" construction, and most of these have involved work for the various

branches of the U.S. armed services. In addition to these tasks for strictly military agencies, OED has performed considerable work for the U.S. Civil Administration of the Ryukyus (USCAR), a "civilian" (rather than a "military") organization. OED's military construction thus falls into two categories: that carried out for the military and that done for the Civil Administration.

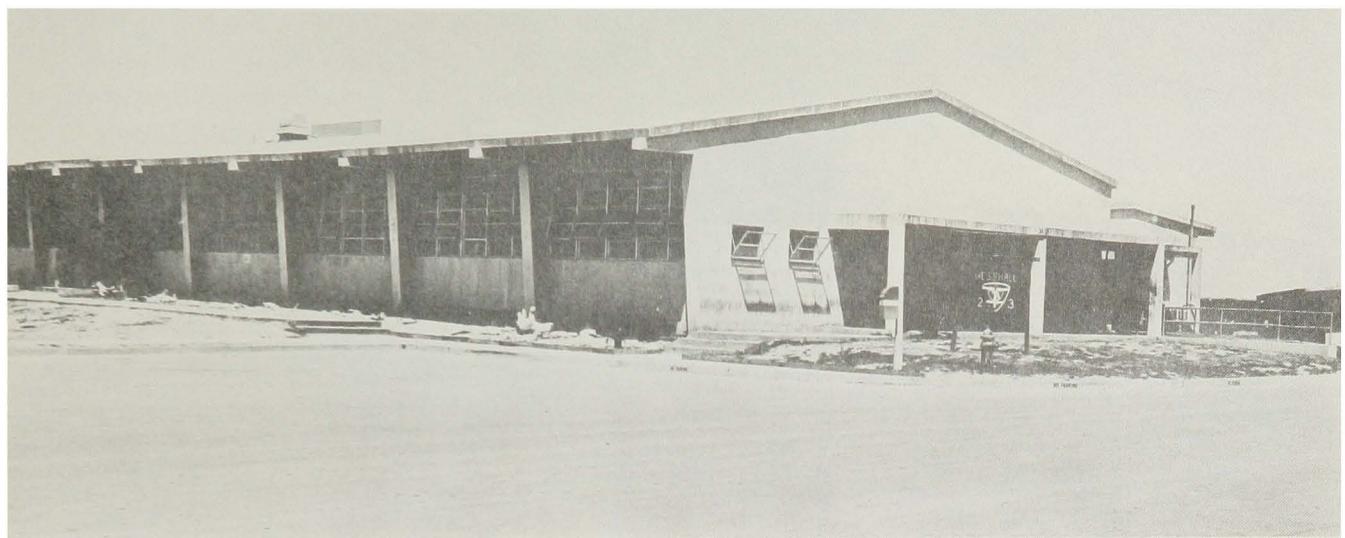
Among the most important activities supervised for the military services in Okinawa and Taiwan between 1957 and 1967 were the development of bases and camps, the construction of communications and missile facilities, and the building of piers and airfields. Several Marine camps on Okinawa received improvements during those years. In 1958, the District completed work at Camp Schwab, a 3,000-man permanent Marine base, and in 1959 OED installed special ammunition storage facilities nearby in Henoko. The construction of these storage facilities cost approximately \$2.3 million; another \$2.7 million construction contract in the early 1960's brought about the development of U.S. Marine Corps facilities at Camp Courtney. Even larger in scope and cost was the 1959-61 project to construct a regimental camp for 5,000 marines at Camp Hansen. This contract, awarded in June 1959 to Kokuba Gumi, totaled approximately \$11 million; the same firm added some new facilities at Camp Hansen in 1964 for approximately \$4 million.

Army base improvements built at the same time included a milk reprocessing plant at the Machinato Service Area, site of additional storage facilities constructed later in the decade and mentioned again below. For the Air Force, OED also constructed base facilities. Between 1961 and 1963 contractors built barracks, bachelor

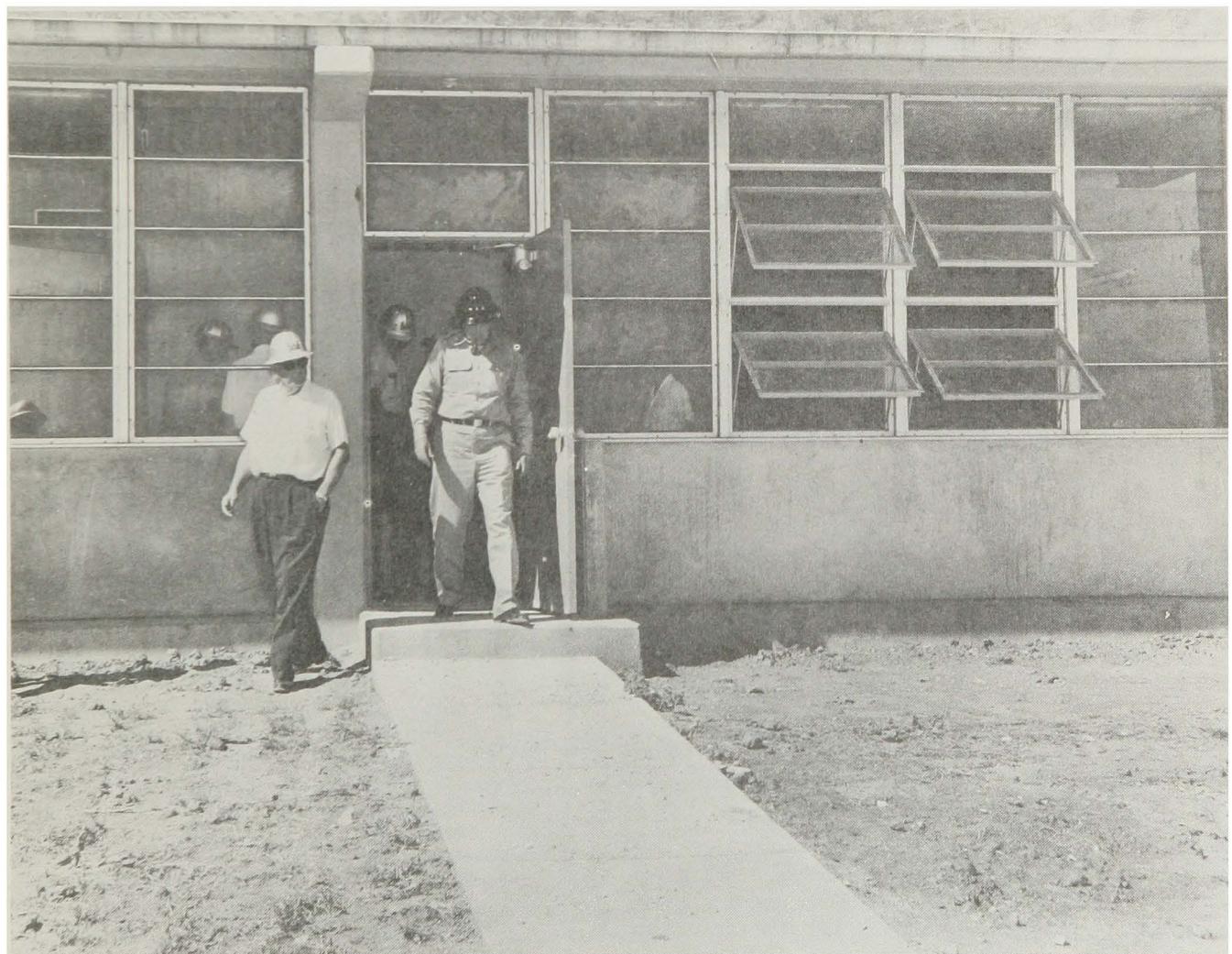
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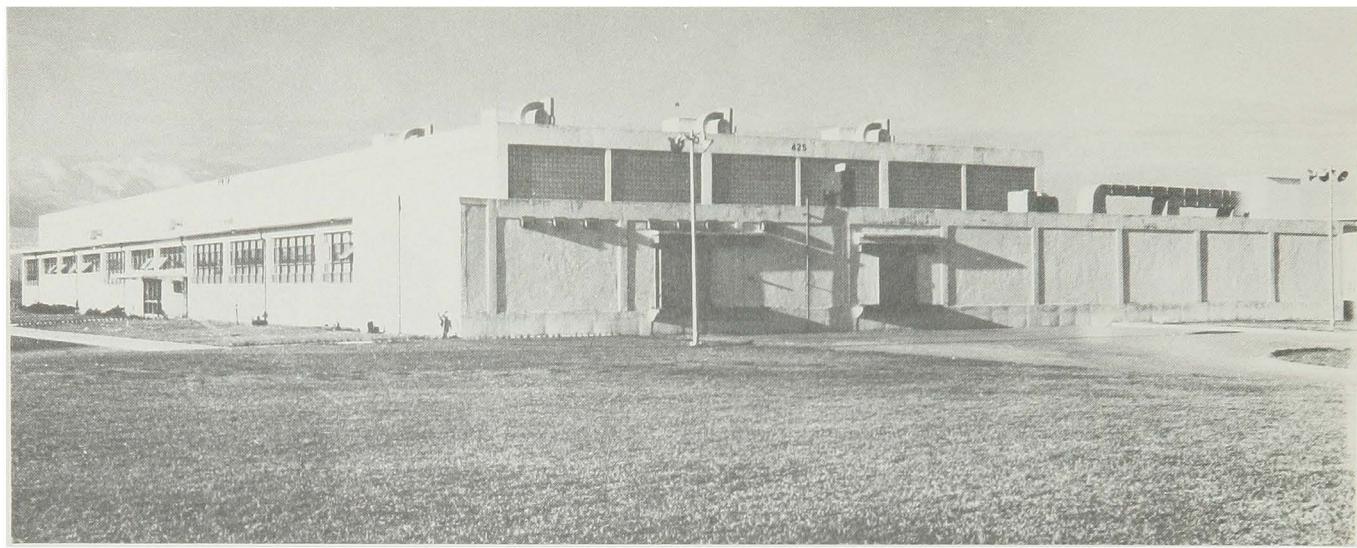
OKINAWA



Messhall built at Camp Schwab, Okinawa, 1958.



Newly constructed Bachelor Officers' Quarters building, Camp Courtney, 1964.



Milk reprocessing plant at Machinato.



Headquarters building constructed at Camp Courtney, Okinawa, 1964.

officers' quarters, and a mess hall at Naha Air Base for a total cost of \$1.2 million. Representative of other air base structures was the 1,000-seat theater erected for \$443,000 at Kadena Air Base. Completed in 1968, this precast concrete and coral theater received a commendation in the Chief of Engineers' architect award category for its use of local materials.

Several District base projects served more than one branch of the military. A number of Tri-Service family housing units were built in the mid-1960's, for example: the Matsumura International Construction Company constructed \$2.6 million worth of quarters at RYCOM Plaza and Futema; the joint venture of Alcan and JHW, Inc. built Tri-Service units for \$7.9 million at Kadena Air Base; and the Tokai International Installation Company completed a similar project for \$2.8 million at Naha. Other contracts with local

firms between 1964 and 1966 resulted in the construction of approximately \$4.8 million worth of Army housing at RYCOM Plaza, Machinato, Naha, Futema, and Camp Kue. 1967 and 1968 also saw housing development at Okinawan camps and bases: Kokuba Gumi built enlisted men's barracks and messes at Machinato for \$1.7 million, while the U.S. firm of Stolte, Inc. erected 188-man bachelor officers' quarters at Machinato and Kue for approximately \$2 million.

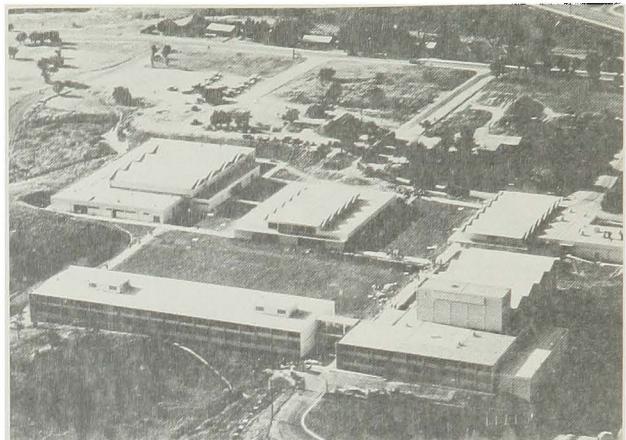
A series of earthquake- and typhoon-resistant chapels designed and constructed in the early 1960's also served families of all the military branches, as did the schools built under OED's supervision. Kubasaki High School at Sukiran saw construction between 1962 and 1965; certain of the school's facilities were made available in 1964. The three-wing, 66-room elementary school built in the Machinato



300-seat chapel built at Sukiran, Okinawa. The same design was used at Kadena Air Base.

housing area between 1967 and 1969 likewise incorporated features of stateside-designed educational institutions and became part of the Department of Defense Overseas Dependents School network on Okinawa. Providing educational improvements and housing as part of base and camp development thus constituted one aspect of OED's work for the military in the 1960's.

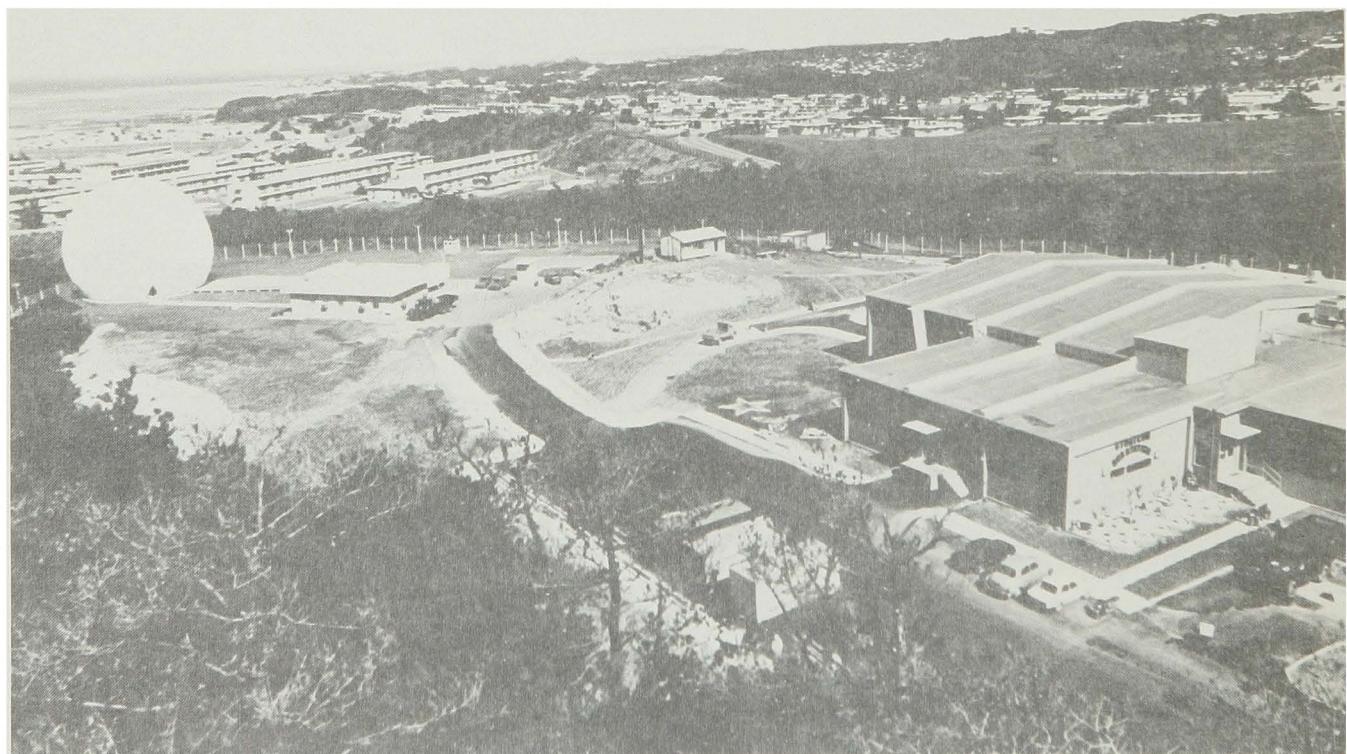
More directly involved with the islands' defense were the communications facilities built for several armed services. A 1961-63 project for the Navy involved the construction of a \$1.6 million Radio Direction Finder (RDF) facility at Sobe on Okinawa; a few years later the District supervised the building of a Long Range Navigation (LORAN) station for the Coast Guard. Operated under the jurisdiction of the Defense Communication Agency and funded by the Army, a \$1 million automatic voice network (Autovon) and automatic digital network (Autodin) project



Kubasaki High School at Sukiran, Okinawa.

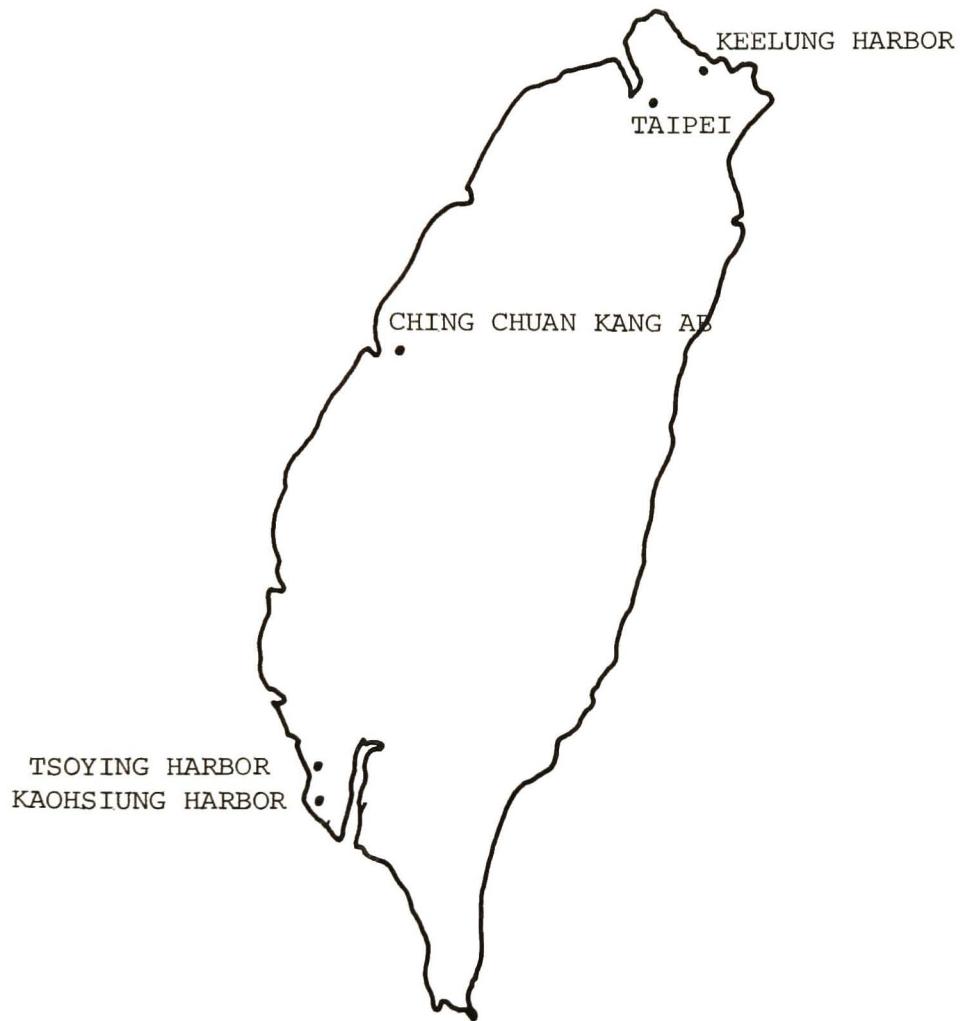
saw construction on Okinawa between 1966 and 1968. During the 1960's the Navy, the Coast Guard, and the Army on Okinawa all received communications improvements.

While base development and communications work took place primarily in the Ryukyus, Taiwan as well as Okinawa shared in most of OED's other endeavors. In the area of missile defense, for example, soon after the establishment of POD the



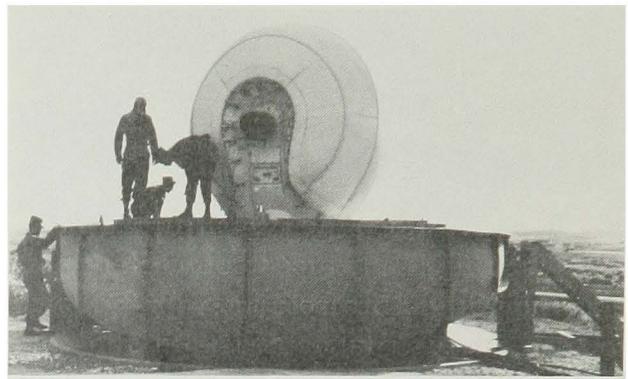
AUTOVON and AUTODIN facilities, Okinawa.

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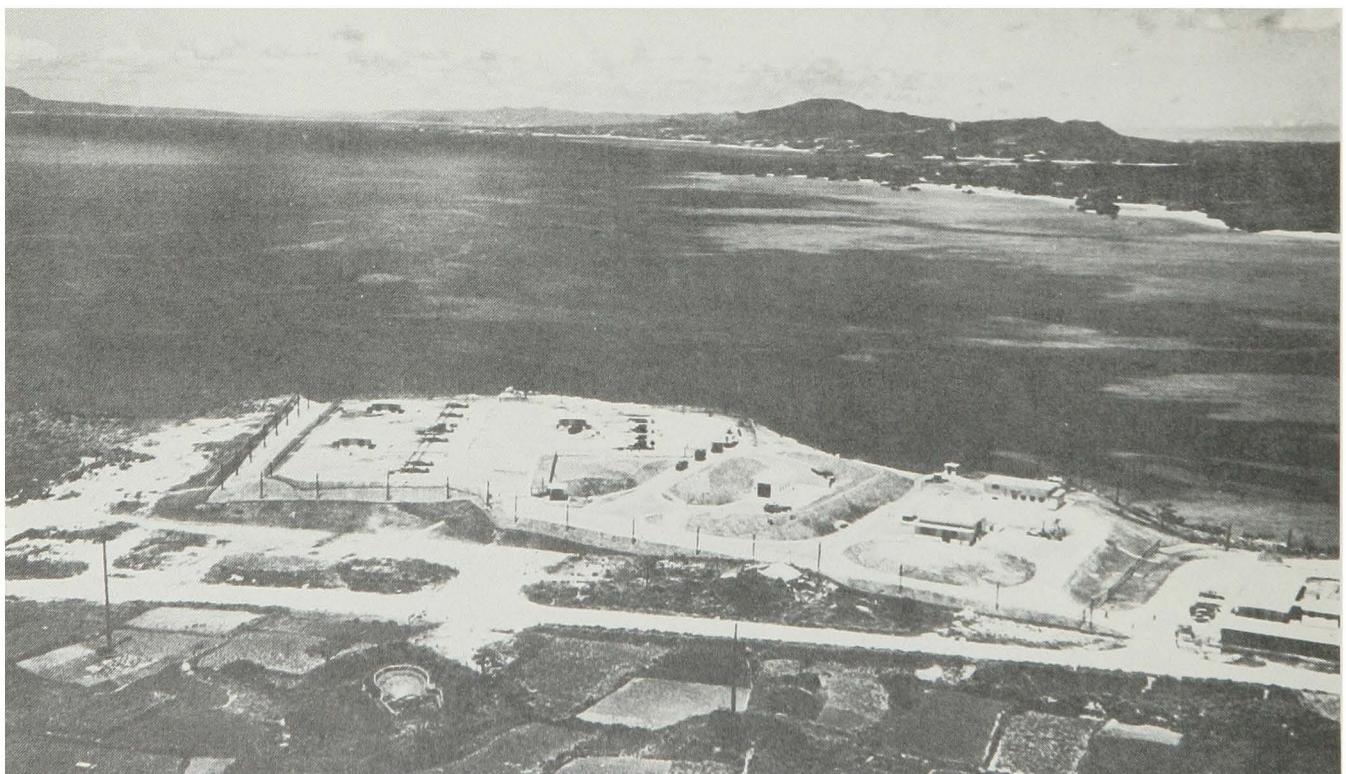
TAIWAN

District began Nike construction on both Taiwan and Okinawa. In mid-1958 tension over the bombing of Quemoy and Matsu in the Taiwan Straits called for the rapid construction of Nike batteries with launching pads and underground control systems on the northern end of Taiwan. OED sent its Engineering Division Chief as technical advisor to a U.S. Military Assistance Advisory Group (MAAG), Taipei, Nike siting team; contracted with a U.S. Architect-Engineer (A-E) firm for the design of all four battery sites; and in September 1958 awarded a \$1.4 million contract to Vinnell Corporation of Alhambra, California, to construct two of the sites. Chinese engineers would build the other two. Design and construction developed concurrently in this crash program for the U.S. Taiwan Defense Command and MAAG. Included in the construction workload were concrete pads and aprons, underground shelters, revet-



Nike radar constructed on Okinawa in the late 1950's.

ments, fencing, and utilities. Construction of the Phase I tactical readiness facilities was finished in the spring of 1959, and design of the Phase II supporting facilities was completed and turned over to MAAG in April of that year. The need for speed and the combination of labor involved (District forces, civilian contractors, U.S. Engineer troops, and Chinese Engineer units) made this project one of the most interesting in the history of OED.



Aerial view of Hawk Site, Okinawa.

Similar Nike facilities were erected at the same time on Okinawa. Whereas the launching pads built on Taiwan were temporary, the eight sites on Okinawa were of permanent construction. Five years later, however, further developments in anti-aircraft called for the construction in Okinawa of a new missile system, Hawk, designed as defense against low-flying enemy planes. Between 1959 and 1965, Kokuba Gumi and BES Engineering Corporation constructed six Hawk sites on the main island of Okinawa and two others on Tokashiki Island; their contracts totaled approximately \$4 million.

Even more interesting missile sites constructed on Okinawa in the early 1960's were the Mace operational facilities built for the U.S. Air Force. Matsumura Gumi developed sites one and two for \$2.4 million; International Constructors built sites three and four for \$3.2 million. The Mace project provided underground areas

from which survivors of an atomic blast could launch retaliatory weapons. Although like Nike-Hercules in Hawaii these Nike, Hawk, and Mace facilities have since been deactivated, at the time they represented an important part of the U.S. defense system. Furthermore, through their development the Division found opportunities to test its designing ingenuity. In devising "clamshell" domes to protect Okinawa's Nike radars from typhoons and in adapting stationary, stateside Hawk designs to allow for mobile equipment at fixed installations, OED developed new engineering techniques.

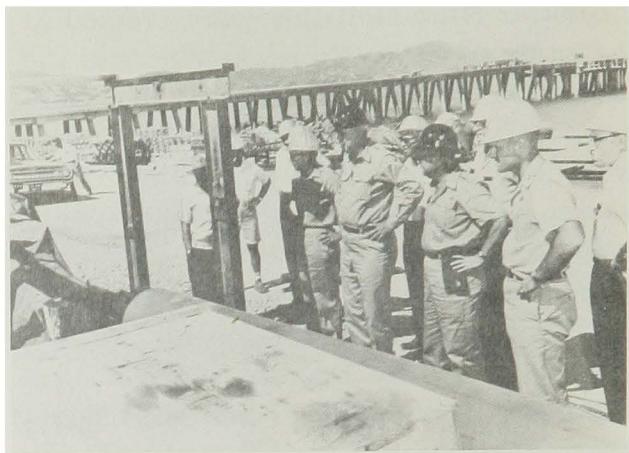
Pier development as well as missile site construction took place on both Taiwan and Okinawa during the ten years beginning in 1957. On Taiwan, in 1958 and 1959 the District prepared several studies for MAAG; these plans considered enlarging a dock at Keelung, executing a MAAG-proposed site plan for a Kaohsiung ammunition pier, and extending a quay wall



The completed pier at Tengan.

at Kaohsiung Harbor. Of even greater importance was the 1960-61 development of the Chinese Naval Harbor at Tsoying. Here the District dredged approximately 11 million cubic yards to reach a harbor depth of 36 feet.

In Okinawa, meanwhile, work began on the design and construction of a Navy deep-water berthing pier at Tengan. Designed by Bourne Associates International (later Lyon Associates) under contract with OED, the open type trestle and pier called for the construction of approximately 800 cylindrical prestressed hollow concrete piles varying in length up to 130 feet. The \$2.8 million construction contract awarded to International Constructors in June 1963 included the casting of these piles at the job site by the moving mandrel method; by April 1964 prestressed piles were being manufactured at Tengan on a production-line basis. The completion of Tengan Pier in 1966 relieved pressure on the ports of White Beach and Naha and facilitated the movement of military men and cargo to and from Okinawa.



Lieutenant General Wilson, Chief of Engineers, inspecting the prestressed concrete piles used to construct the berthing pier at Tengan, Okinawa, 1964. The partially erected pier is in the background.

A few years later, in 1970, contractors finished a \$1.4 million petroleum, oil, and lubricants (POL) unloading facility at Tengan as part of the fiscal year 1966 Supplemental Military Construction Program. This Army project consisted of a POL mono-buoy and an 18-inch submarine pipeline. At the same time, OED supervised the construction of a \$3.5 million major port facility for the Navy at White Beach, where the prestressed concrete



View of the pier at White Beach, Okinawa.

piling developed at Tengan and the tribars designed for Nawiliwili were used once again. Work at Tsoying, Tengan, and White Beach thus enlarged the District's area of activity to include harbor dredging and pier construction.

MAAG, the \$25.5 million "KQ 502" project included a 12,000-foot rigid pavement runway, taxiways, aprons, and access roads. Among the major construction contractors was the Vinnell Corporation.

Kung Quan returned to prominence in



Airfield construction at CCK, Taiwan, around 1967.

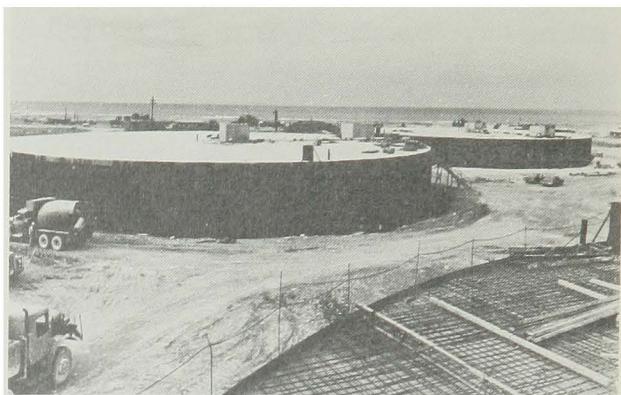
Paralleling this harbor development for the U.S. Navy was OED's extensive program of airfield improvements for the Air Force. One of the first projects handled by the District after its assignment to POD was the development of a modern air base at Kung Quan, Taiwan, between May 1957 and April 1959. Funded by the Military Assistance Program (MAP) and

OED's history in 1966, when, renamed Ching Chuan Kang Air Base (CCK), it became an important focus of the District's work under the fiscal year 1966 Supplemental Military Construction Program. "66-S" funded several important construction activities in support of the U.S. military mission in Southeast Asia and included POD projects in Japan as well as

major improvements, primarily for the Air Force, in Taiwan and Okinawa. For the work at CCK, the District in January 1966 designated Lyon Associates, Inc., and Henningson, Durham and Richardson as Architect-Engineers. In May 1966 OED awarded the construction contract to Vinnell Corporation, and at the same time the District established a new Resident Office in Taiwan to administer the cost-plus-fixed-fee (CPFF) contract with Vinnell.

The relative importance of the job at CCK and of the CPFF contract with Vinnell is reflected in these statistics dated 15 October 1967, when OED's forces on Taiwan administered a total construction contract amount of \$20.4 million. Of this, \$19.9 million was work for the U.S. Air Force, and of this Air Force workload, \$18.3 million—almost 90%—was for construction at CCK. \$11.9 million of this \$18.3 million, furthermore, represented the CPFF contract with Vinnell; smaller contracts with several U.S. and Chinese firms covered the remainder of the construction project. One of the largest CCK tasks handled by Vinnell was the installation of a POL complex, a \$6 million package which included a mooring system, a pipeline, and fuel storage facilities.

Concurrent work for the Air Force under 66-S took place at Okinawa's Kadena Air Base, where Pomeroy-M-B constructed \$6 million worth of airfield improvements between May 1966 and mid-1968 via a CPFF contract. Other Kadena projects included liquid fuel storage facilities, hangars, and support structures as well as airfield pavements. In addition to these Air Force projects, OED supervised some construction at Machinato, the U. S. Army's primary storage depot area on Okinawa. A contract dated 20 June 1966 with TKU Construction, Inc. resulted in



Liquid fuel storage facilities at Kadena Air Base, 90% completed, March 1967.



66-S airfield construction at Kadena Air Base.

the construction of almost \$5 million worth of general purpose warehouses at Machinato, thereby doubling the storage space available to the 2nd Logistical Command. Of special interest was the use of the warehouse rooftops for additional storage; designed by OED's Engineering Division, this on-roof storage space was geared to carry a live load of 200 pounds per square foot and to sustain winds of 180 miles per hour. The rooftop area became a major storage site for artillery pieces, bulk cargo containers, and vehicles returning from Viet Nam.

In fiscal year 1968 this Army warehouse with roof storage received an honorable mention in the engineering division of the Chief of Engineers' design awards program for its economical use of limited



On-roof storage facilities at Machinato Service Area, Okinawa.

space. Additional accolades were given OED as a result of the 66-S program in Taiwan and Okinawa, as several District officers were commended for their supervision of the CPFF contracts at CCK and Kadena. Climaxing the citations was the Meritorious Unit Commendation awarded to OED for the District's design and construction of the projects at CCK, Kadena, and Machinato, for these combat support facilities had aided the U.S. military effort in Viet Nam.

The decade between 1957 and 1967 thus began and ended with work at the Machinato Service Area and also with airfield construction on Taiwan. Airfield improvements, in fact, comprised a significant segment of the District's construction for the military services, and, together with the development of bases and camps and the erection of various missile facilities, meant that OED usually spent more on these "military" projects than on work for "civilian" groups. In fiscal year 1959, for instance, during construction at KQ 502, the District's workload for the Army, Air Force, and Navy totaled approximately \$41.7 million; the figure for USCAR work was only \$113,000. Similarly, during 66-S construction, the Army, Air Force, and Navy workloads for fiscal year 1967 ran to \$62.4 million while USCAR projects total-

ed \$8.4 million. Even without major airfield jobs, the "military" workload was usually larger than the "civilian." In fiscal year 1964 the ratio was \$23.2 million to \$10.8 million; in fiscal year 1965 it was \$25.5 million to \$6.3 million.<sup>2</sup>

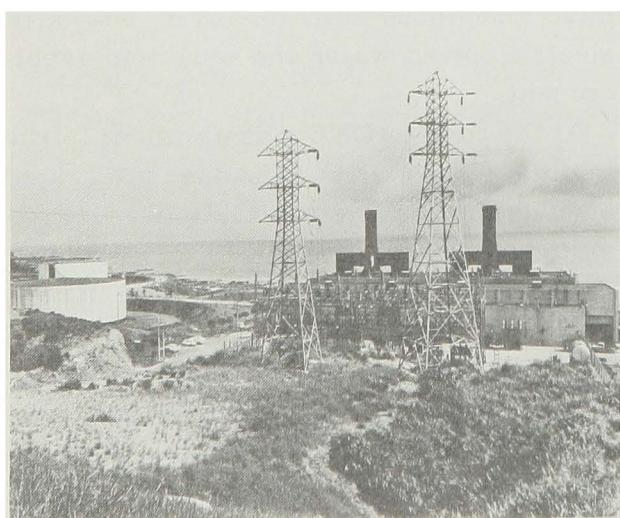
While the work performed for "civilian" agencies in Okinawa represented a fiscally smaller portion of OED's workload, these tasks have involved the District in a variety of interesting endeavors. As Engineer Advisor to the High Commissioner (HICOM) of the Ryukyu Islands, the Okinawa District Engineer has furnished general engineering planning guidance and other engineering support to the U.S. Civil Administration of the Ryukyus. Design and construction for USCAR have been carried out on the basis of memoranda of understanding between the Chief of Engineers and the Chief Executive Officer of the USCAR corporation involved; the Chief of Engineers delegates authority to the District Engineer, who then executes the duties of Contracting Officer of the corporation. Among the District's USCAR clients are the Ryukyu Electric Power Corporation (REPC), the Ryukyu Domestic Water Corporation (RDWC), and the Ryukyu Sewerage Corporation. These agencies have introduced OED to "civil" works in electric power, water and sewerage development.

At the time of OED's assignment to the Pacific Ocean Division, the integrated electric power system on Okinawa was operated by the U.S. Army, which sold power to the Navy, the Air Force, and REPC. Power at that time came from several sources: from the old Machinato Power Plant, constructed by OED in the early 1950's; from two power barges, the "Impedance" anchored at Naha Port, and the "Jacona" moored off Sukiran; and from a 5,000-KW power train and some smaller

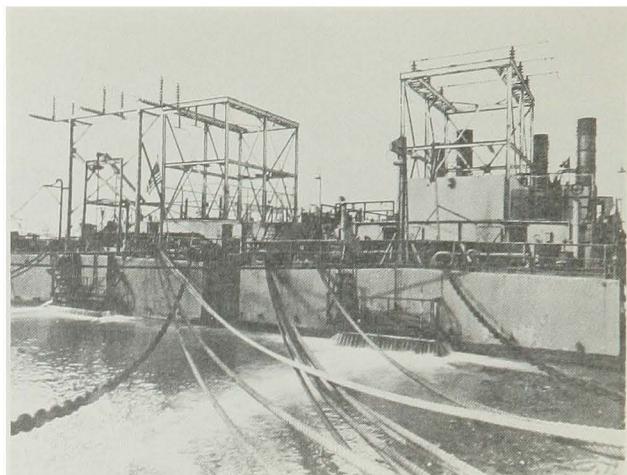
diesel plants. The post-World War II influx of U.S. forces and dependents and the simultaneous increase in domestic power consumption strained these limited facilities, however, and created a power shortage. The lack of such natural heating resources as coal and water led the Okinawa District to relieve the shortage by constructing a major electric power plant at Kin.

Designed by the Kuljian Corporation of Philadelphia and built between February 1963 and July 1965 by International Constructors, the \$14.7 million Kin Power Plant included four 22,000-KW turbogenerators whose output almost doubled Okinawa's permanent electric power capacity. A low-interest, long-term U.S. Treasury loan financed the project; the REPC has operated the plant since its completion. In 1965 the Government of the Ryukyu Islands issued a three-cent stamp commemorating the construction of this power plant on the eastern side of the island.

1 July 1965 saw not only the completion of the Kin Power Plant but also the transfer of electric power production in Okinawa from the U.S. Army to the REPC. The corporation would now sell power to the armed services; the District



Kin Power Plant, Okinawa.



The power barge "Impedance."

Engineer would continue to act as Contracting Officer of REPC. Soon after this transfer, REPC and the District began planning for the enlargement of the Machinato Power Plant. In December 1965 OED awarded the A-E contract for a plant addition to Burns and Roe of New York. Construction of two 80-MW steam-turbine generators began in the fall of 1968, and this \$19.4 million addition was scheduled for completion in late 1970.

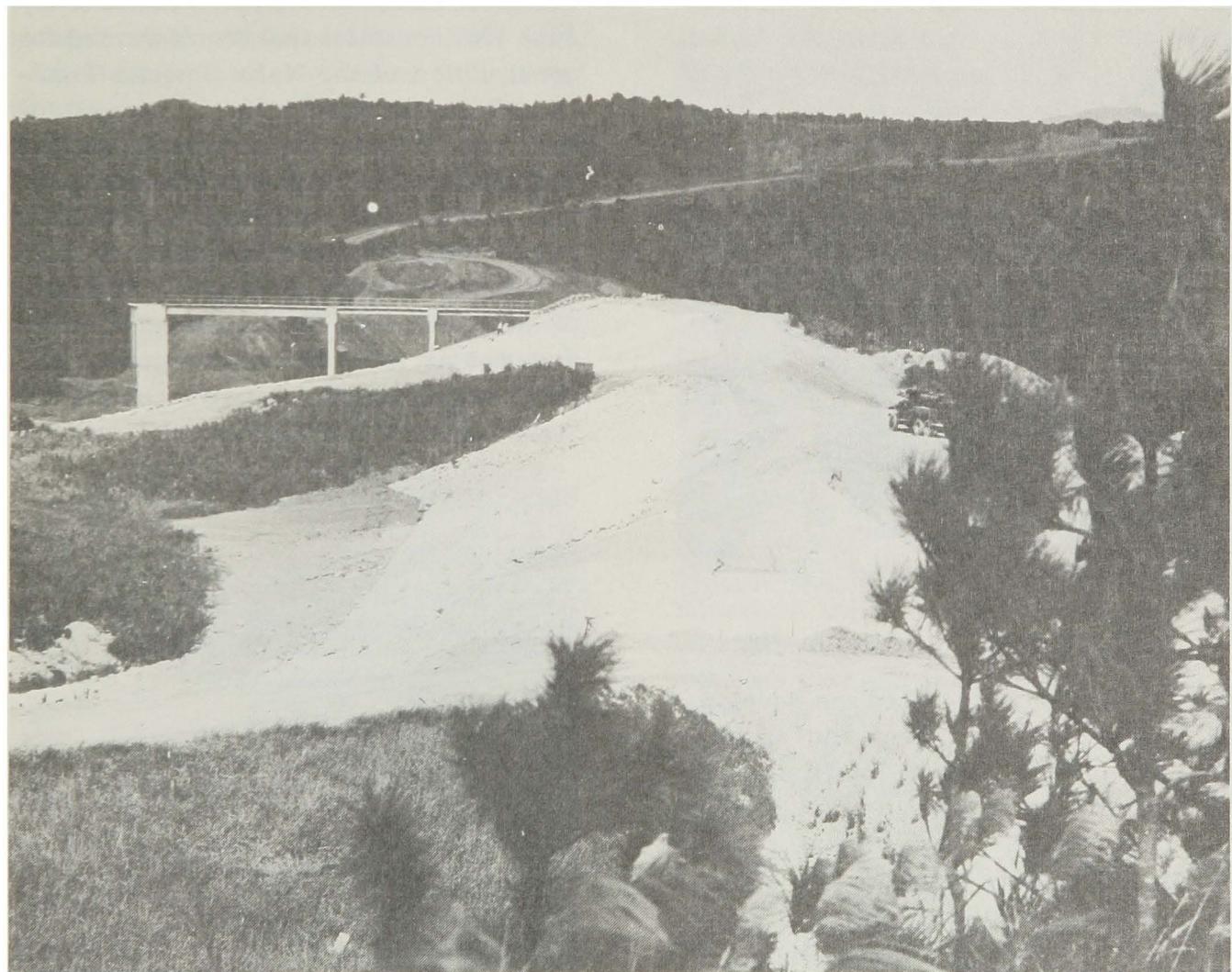
To meet increasing military requirements for power while the Machinato Power Plant was being enlarged, in 1967 the Corps of Engineers purchased a 30-MW floating power plant from the city of Jacksonville, Florida. The Jacksonville Engineer District rehabilitated the power barge, "Inductance;" the Chief of Engineers loaned it to the U.S. Army, Ryukyu Islands (USARYIS); and REPC in turn leased the plant from the U.S. Army. In January 1968 "Inductance" was connected to the Okinawa Electric Power System via mooring facilities constructed at Naha Port through an OED contract. The utilization of this additional floating power plant enabled REPC to release power from its other island generators for military use. Thus OED's role in developing Okinawa's electric power system was expanded to include the installation

of floating power sources as well as the construction of permanent facilities at Kin and Machinato.

Like electric power, water on Okinawa has been in limited supply. The heavy use of water for growing rice, the lack of sufficient water storage sheds, and the rapid growth of Okinawa's American population in the late 1950's all strained existing water facilities. In addition, the island's water sources lie in the north, while demand is greatest in the south. OED's water development projects have aimed to relieve the shortage via storage dams and connecting pipelines. Whereas REPC has operated Okinawa's electric power system

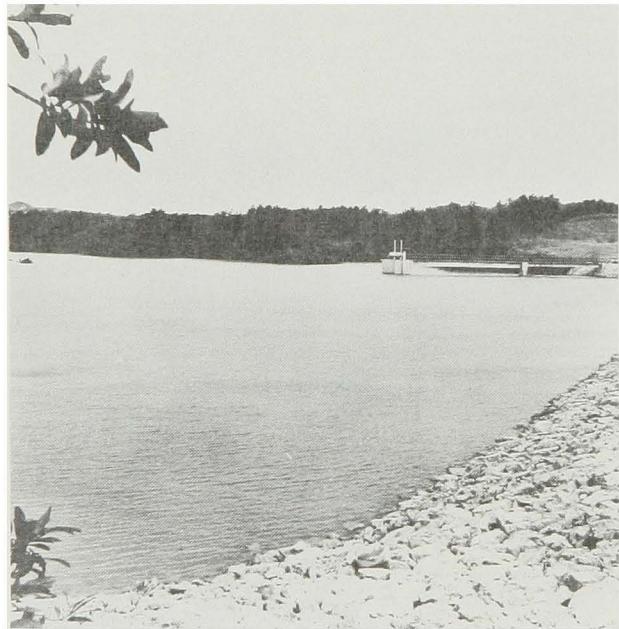
since 1965, control of Ryukyuan water facilities has remained in the hands of USARYIS. In both cases, the Okinawa District Engineer has acted as Contracting Officer for the domestic corporation.

One of the first water projects handled by OED after 1957 was the construction of Zukeyama Dam, a 55-foot earth-fill storage facility with a capacity of 600 million gallons. Completed in February 1961, this reservoir at Kadena Air Base has relieved water shortages in Okinawa. A similar, 137 million-gallon storage reservoir built at Camp Hansen at the same time was transferred in 1966 to RDWC jurisdiction.



Zukeyama Dam, Okinawa.

In 1963 a memorandum of understanding between RDWC and the Chief of Engineers assigned OED as the major design and construction agency in the expansion of Okinawa's Integrated Island Water System. OED soon designed the integrated system for the island and, as an initial phase of the system's development, in September 1964 awarded a \$2.4 million contract to the American Pipe and Construction Company for the production of 184,000 lineal feet of concrete pressure pipe. The next major project completed as a part of the integrated water system was the 330 million-gallon Tengan Dam, built between 1964 and 1968. At the same



Reservoir at Tengan Dam, completed in 1968.

time the District supervised the development of a water treatment and storage plant at Ishikawa. This \$2.7 million facility, capable of purifying and pumping 30 million gallons per day, proved a vital link in the island's water system. More recently, the District has been developing a dam and reservoir at Fukuji in the north. A 1965-67 study by the New England Division recommended Fukuji as a possible

site for a variety of facilities. The Los Angeles District then proceeded with the design of the \$10.4 million rock-fill dam while OED began supervising the construction of an associated water line from Ufu to Fukuji. The Okinawa District's water development work has focused on pipelines, treatment plants, and water storage dams.

Among the other projects constructed for USCAR have been sewage disposal facilities, an important bank, and a recent Civil Air Facility. Plans formulated in the 1960's called for the creation of two sewage disposal areas in southern Okinawa: one from Naha to Machinato and the other from Machinato to Kadena. By June 1967 contracts had been awarded for construction of the Naha Sewage Treatment Plant and Interceptor Sewer and for the Koza Interceptor Sewer, while the Sukiran Sewage Treatment Plant and Interceptor Sewer and the Naha Sewer Line were under design. The total estimated construction cost of these six facilities as of mid-1967 was \$9.8 million. Sewage disposal as well as electric power and water involved the Okinawa District in "civil" projects for USCAR.



Water treatment plant at Ishikawa, Okinawa.

In addition, between 1964 and 1968 OED supervised the construction of the Bank of the Ryukyus in Naha. This reinforced concrete structure cost over \$1 million and was enlarged in 1970 by two additional floors. Even more recently, the District has been involved with the construction of the USCAR Civil Air Facility at Naha. Under a special agreement between the Chief Executive of the Ryukyus and the District Engineer, OED has been in charge of the design of the project and of the construction of its first phase. This portion of the facility includes land reclamation by dredged fill, rough grading, and construction of a revetment or seawall, to which the District has applied the tribar techniques developed by HED.

In this reclamation work as well as in its other tasks for USCAR, the Okinawa Engineer District has been involved in many projects customarily classified as "civil." The construction of these projects, and the building of base facilities, missile sites, and airfield improvements for the armed services, have combined to contribute variety to POD's work in Okinawa and Taiwan. Both the Honolulu and the Okinawa Districts have experienced considerable diversity in the design and construction of their military and "civil" projects.



50-bed hospital constructed for PROVMAAG-K in Seoul, Korea, 1960.

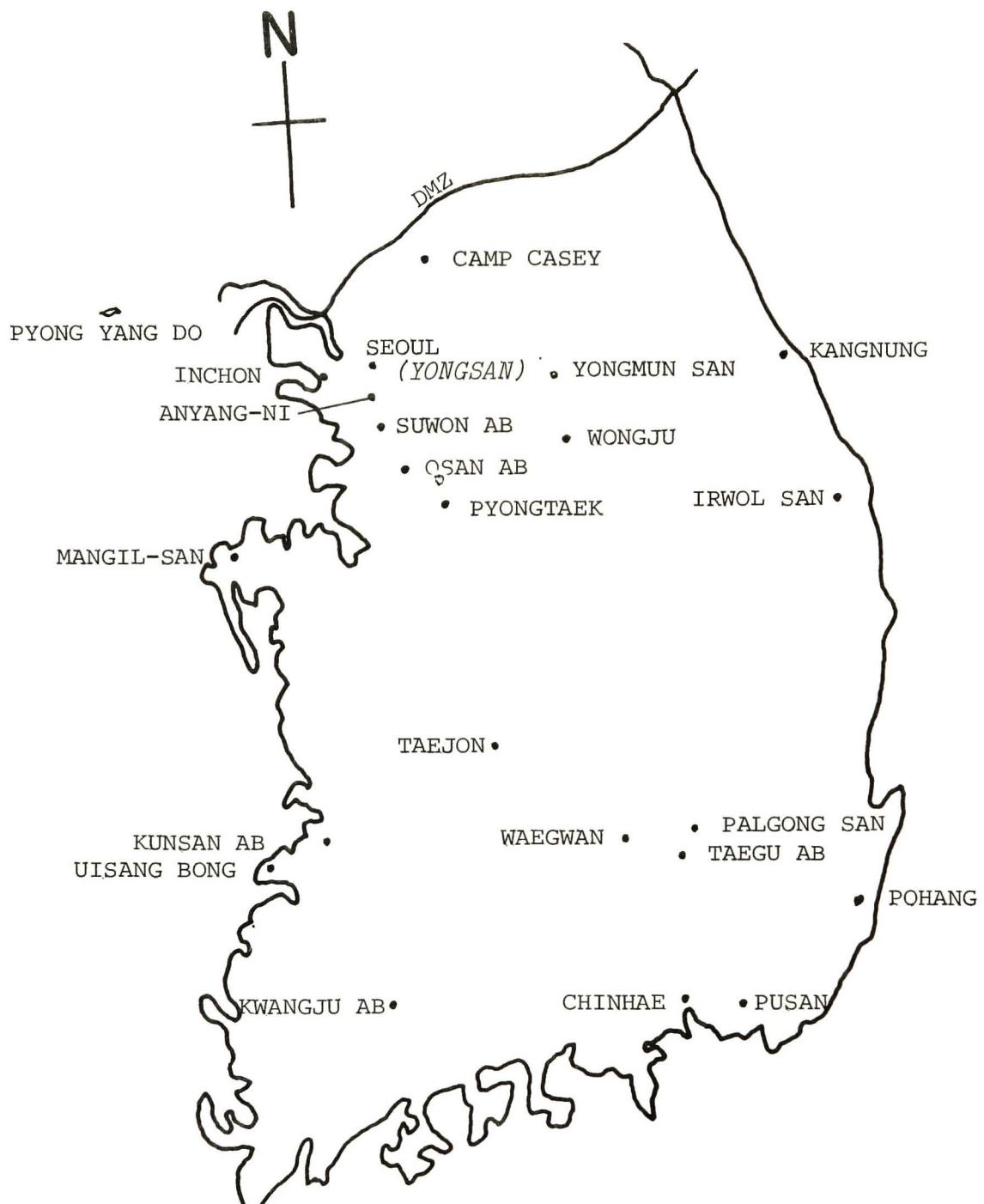


Bank of the Ryukyus, Naha, Okinawa.

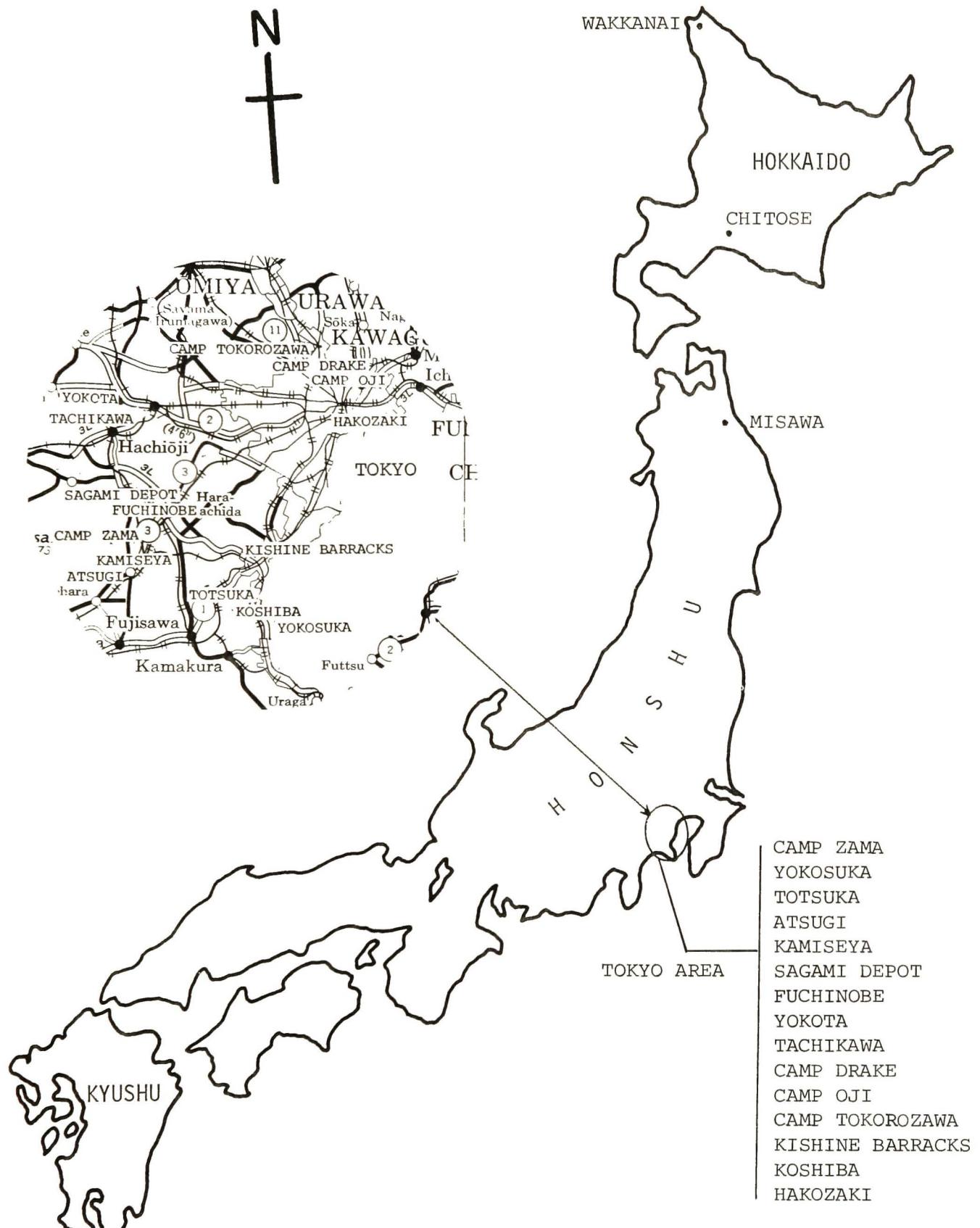
The activities of the Far East District have also reflected a varied workload, although FED's projects do not fall into "military/civil" categories as do those of the other Districts. Instead, the Far East District's history can be seen in two distinct periods: between 1957 and 1963 the emphasis lay on work in Korea, while from 1963 to 1967 activity increased in Japan. 1968 and 1969 then saw a boom in Korea as a result of the 1968 Supplemental Military Construction Program.

Thus FED's first five or six years focused on construction in Korea, with relatively few projects in Japan. Most of the District's early activity in Korea aimed at making the land habitable for U.S. forces; whereas Hawaii had hosted U.S. troops since the turn of the century, Korea in 1957 was a new duty station for most American soldiers and hence in need of extensive living and operational facilities. Between 1957 and 1963 FED constructed a variety of such projects for U.S. Army divisions, for United Nations (UN) and Eighth U.S. Army (EUSA) headquarters, and for MAAG and OEC.

Typical of these accommodations was the PROVMAAG-K housing area developed around 1960 at Chinhae. This new community of 200 duplex homes also included a commissary, hospital, dental



KOREA

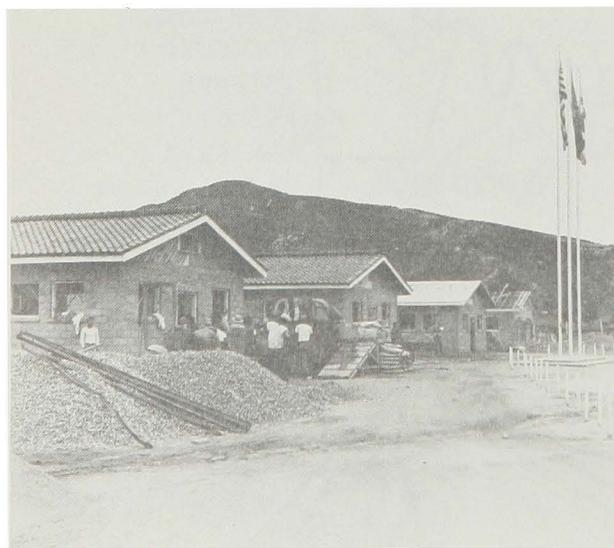


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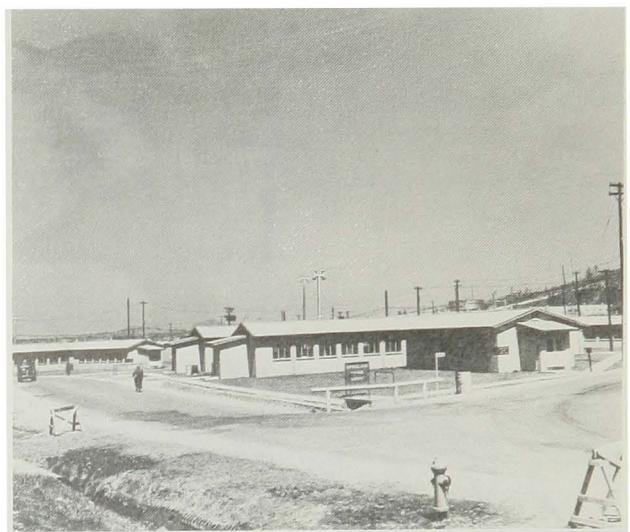
clinic, fire station, library, and post exchange. A similar project was built at the same time near Seoul; here FED supervised the construction of housing for PROVMAAG-K, an officers' club and golf course for the Eighth U.S. Army, a commissary, dependents' high and grammar schools, and a 50-bed military hospital. Airmen's dorms at Osan Air Base, mess-halls, barracks, and latrines at Camp Casey, a water supply and distribution system at the Army Service Command (ASCOM), and a water treatment plant at Seoul were among the other support facilities built in Korea around 1960. Most of these projects were built via small



A four-bedroom housing unit built for PROVMAAG-K dependents at Seoul, 1960.



Construction of a 72-man barracks at Camp Casey, Korea, 1958.



Airmen's dormitories built at Osan Air Base, Korea, 1960.

contracts: the eight latrines and five mess-halls at Camp Casey cost approximately \$365,000, for example, and the contract for the ASCOM water system totaled \$251,000.

At two sites in Korea, FED helped develop large ordnance or supply depots which, with related facilities, actually became entire camps. July 1959 saw the start of construction at Taejon of the Spring Valley Ordnance Depot, an 800-acre complex with an overall contract value of more than \$1.5 million. The project eventually included barracks, BOQ's, a messhall, a dispensary, and water, sewage, and power distribution systems. Also begun in 1959 was a supply depot at Waegwan which developed into Camp Carroll. FED was in charge of all permanent buildings at Camp Carroll, while troops of Company B, 44th Engineer Battalion, handled the earthwork, site preparation, and miscellaneous base construction. Among the facilities erected there between 1959 and 1962 were maintenance buildings, barracks and a messhall, two unheated warehouses, roads, and utility systems. Work continued into the mid-1960's on other Camp Carroll accommodations. In addition to these logistics facil-

ties at Taejon and Waegwan, FED supervised the construction of several Stradley magazines at various locations in Korea and between 1960 and 1962 paid the Hyun Dai Construction Company of Seoul approximately \$619,000 to build 19 ammunition storage buildings at Taejon, Wonju, and Anyang Ni.

Even these supply and ordnance projects involved relatively small contracts. Only two very large jobs stand out during the period from 1957 to 1963: the design and construction of a cold storage plant at Pusan, and the rehabilitation of the Tidal Basin at Inchon. Included in the project for Pusan were refrigerated storage areas, an ice manufacturing facility, a water treatment plant, and exterior utilities. Design by an A-E firm was completed in 1958 and construction of the \$1 million project took place between 1960 and 1963. In order to insure the continued use of the Inchon Tidal Basin for U.S. and U.N. forces as well as for the

Korean civilian economy, meanwhile, the District began to rebuild certain basin facilities which had been destroyed during the Korean conflict. Construction began in June 1959 and was largely finished by 1961; the project entailed dewatering the lock and basin, rehabilitating the locks and seawall, installing an electrical distribution system, and dredging approximately 130,000 cubic yards of material. Contractors also constructed new maintenance buildings, a wharf, and a ramp. Hyun Dai Construction Company handled the bulk of the construction at a contract cost of approximately \$1.9 million.

FED's work in Korea from 1957 to 1963 thus focused on living and operational facilities throughout the country, on the development of camps, and on these projects at Pusan and Inchon. The District's workload in Japan remained small, with most efforts directed at base facilities for the Army Security Agency's (ASA) station



Aerial view of Inchon Tidal Basin, Korea.

at Chitose. One of the first projects constructed at this post on the northern island of Hokkaido was the BOQ and officers' mess complex built by Ohki Construction Company, Ltd. for approximately \$95,000. Ohki also erected \$681,000 worth of enlisted men's barracks and mess facilities in 1960 and 1961. Headquarters buildings and vehicle storage sheds cost an additional \$204,000, while exterior utilities were built for \$336,000. A series of negotiated contracts with Ohki in 1962 provided for a fire station, motor repair and ordnance field maintenance shops, a dispensary and dental clinic, and two warehouses. Additional facilities built at Chitose during the early 1960's included a non-commissioned officers' (NCO) open mess, an enlisted men's service club and library, a boiler plant, and a heating distribution system. These jobs for ASA at Chitose constituted the major part of FED's Japan workload between 1957 and 1963.

On 1 July 1963, then, the Department of Defense (DOD) designated the Far East Engineer District as the design and construction agency for all the U.S. military services in both Korea and Japan. Until then, although the District might perform work as requested by the Air Force, most of its jobs were done for various Army and State Department agencies. FED's new assignment in 1963 created an increase in overall workload, since now the District would handle Navy and Air Force as well as Army projects, and, in addition, resulted in a shift of emphasis from Korea to Japan.

Even in Korea, new Air Force projects meant more work for the District after 1963. At the same time, FED began to award larger contracts to both Korean and American firms. These developments accompanied the transformation of the Far

East District from a relatively young engineer district to an experienced construction agency supervising a variety of tasks. In July 1964, for example, FED combined many small jobs at Osan and Kunsan Air Bases into one large package and awarded the \$1.6 million contract to Stolte, Inc. of Oakland, California. Completed in September 1965, this project for the U.S. Air Force and Army included a Navigational Aids building at Kunsan and a tactical facility at Osan.

Between 1965 and 1968 Stolte constructed an even larger project of Aircraft Control and Warning (AC&W) sites and Army Flight Activity, Ground (AFAG) support facilities. The A-E firm of Daniel, Mann, Johnson and Mendenhall (DMJM) designed the project under contract to FED. Among the AC&W facilities built at Pal-gong San, Uisang Bong, Mangil San, Yong-mun San, and Irwol San were steel-framed operations buildings, pump houses, and security gate houses; generator buildings; prefabricated transmitter-receiver buildings; and exterior utilities. AFAG support facilities erected at each of these five sites included a prefabricated training, recreation, and dining hall; an administration and unit supply building; and a two-story dormitory. At Kangnung, Cheju Do, and Pyong Yang-Do, the contractor built AC&W sites with operations, generator, and transmitter-receiver buildings. The \$4.6 million contract awarded to Stolte in March 1965 totaled almost \$8.3 million when it was closed out three years later. Another Air Force project handled by FED between 1963 and 1967 involved construction at the auxiliary airfield at Taegu. DMJM designed the facilities; D.F. Fischer and Sons, Ltd. managed the rehabilitation of the primary runway and taxiway, the construction of the runway overrun, the installation of a runway and taxiway lighting

system, and additions to existing drainage facilities.

Most of these post-1963 projects arose as a result of FED's new assignment as construction agency for the U.S. Air Force in Korea. Some fulfilled the needs of the U.S. Army as well, and, indeed, from 1963 to 1967 FED continued to design and construct facilities for both the Army and State Department agencies. The U.S. Army aviation facility at Pyongtaek, for example, received improvements after 1963: near the end of that year the District signed a \$350,000 contract with Dai Han Electric Development Company, Ltd. of Seoul, for the construction of a vehicular maintenance building, an administration building, enlisted barracks, a mess hall, and a BOQ. A \$1 million contract awarded to Hood International of Whittier, California, in early 1964 provided for the construction of a new 35,000-square foot hangar with central heating, sprinkler protection, sanitary facilities, and shops. These additions made Pyongtaek the largest U.S. Army aviation facility in Korea.

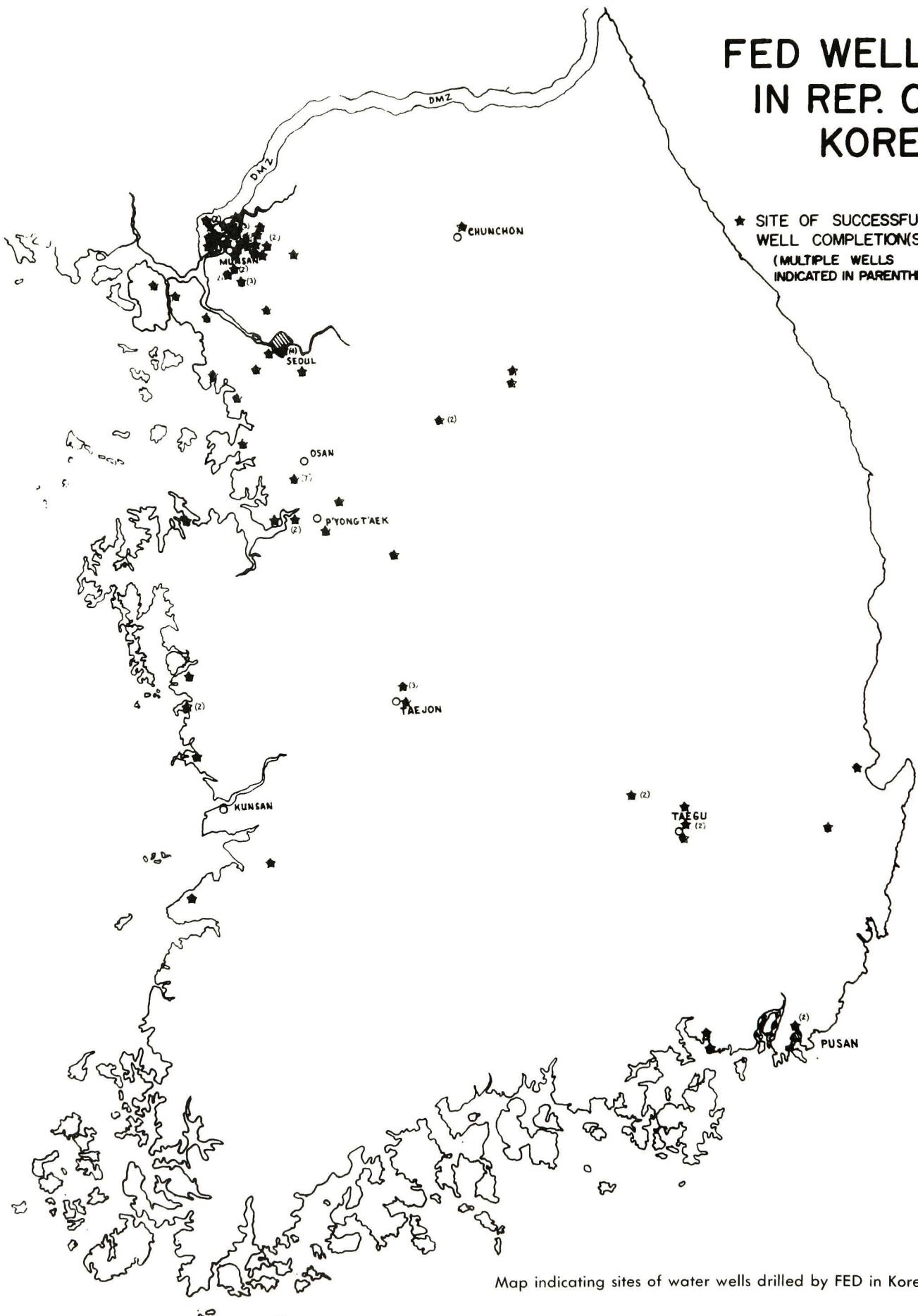
Other Army work completed between 1963 and 1965 included a \$1.7 million project at Waegwan. There U.S. contractors built a maintenance shop, a boiler plant, a sewerage system, and extensions to the water supply and distribution system, as well as roads and hardstands. A smaller project for housing and related facilities at Pohang was awarded in June 1965. Further north, between 1966 and 1968 the 2nd Infantry Division received over 550 units of troop housing; joint ventures of local firms handled this construction in four separate contracts totaling approximately \$1.3 million. Among the dependents' facilities designed and constructed in the Seoul area after 1963 were a new hospital, an elementary school addi-

tion, and a post exchange. Adrian Wilson Associates designed the new 121st Evacuation Hospital in 1967 and 1968, and construction began in January 1969; when completed, this medical facility will be joined to the old hospital constructed under FED in 1959. Completed in 1969, the 14-room addition to the Seoul American Elementary School in Yongsan is a masonry structure built by Sam Whan Enterprise. Also under construction at Yongsan at the end of 1969 was a new \$1.4 million prefabricated post exchange with 44,000 square feet of floor space.

One of the most interesting projects developed for the Army since 1963 has involved the Far East District in deep-well drilling throughout Korea. To provide potable water for Eighth U.S. Army personnel without expensive water hauling from surface sources, in 1966 FED began to tap the ground water in Korea's crystalline rocks. Since then the District has converted at least 78 of the 101 exploratory wells into usable facilities, thereby providing contamination-free water at over 50 U.S. installations. In-house design and construction by FED's Exploration, Laboratory and Survey Section (EL&S) have resulted in considerable savings over alternative contractor costs.

Through the water well program, other projects for the U.S. Army, and new airfield tasks, FED expanded both its workload and the scope of its activity in Korea after 1963. Even more dramatic was the increase in the design and construction program carried out in Japan. The addition of Air Force work, first of all, was a major factor in introducing the District to new jobs. In mid-1963 certain design and construction responsibilities in Korea and Japan were transferred from units of the Pacific Air Force (PACAF) to the Corps of Engineers. According to a memo-

# FED WELLS IN REP. OF KOREA



randum of understanding between PACAF and the POD Division Engineer, PACAF would complete the design of all fiscal year 1964 (FY 64) and prior Military Construction Program (MCP) projects and all fiscal year 1963 and prior Military Assistance Program (MAP) projects, while the Corps of Engineers would handle subsequent fiscal year program design. A similar agreement on the transfer of construction duties specified that POD would act as construction agent for the Air Force in Korea and Japan after 1 July 1963. As expanded on by the Office of the Chief of Engineers, this meant that with some exceptions POD's responsibilities for Air Force design would begin with FY 65 projects and those for Air Force construction with the program for FY 64.<sup>3</sup>

Among the exceptions were several important jobs in northern Japan. FED would take care of the redesign of the electric power plant at Wakkanai, a FY 62 project; the District would also serve as construction agent for some FY 61, 62, and 63 projects at Misawa and Wakkanai which had been designed under Air Force supervision. Thus FED's first major assignments for the Air Force in Japan involved work at these posts in the north.

The Air Force operations and support facilities built for the 6986th Security

Group, Air Force Security Service (AFSS) at Wakkanai included an operations building; antenna foundations; a heating plant; a commissary, school, post office, and dispensary; a telephone exchange; and a warehouse and laboratory. Constructed of cast-in-place concrete and concrete block masonry, these items cost a total of approximately \$3 million; the contract with Nishimatsu Construction Company, Ltd. of Tokyo for the operations facility alone came to \$1.5 million. Most of the facilities were completed between 1963 and 1966. A concurrent project at Misawa Air Station called for an operations building, antenna foundations, and concrete support structures similar to those built at Wakkanai. The contract with Nishimatsu for these improvements at Misawa totaled \$3.4 million when construction was finished in 1965.

A more recent Air Force project in Japan involved work on the Kanto Plains Communications System. Between August 1966 and autumn of 1968 contractors constructed four concrete buildings at Yokosuka Naval Base, Totsuka Naval Radio Station, Atsugi Naval Air Station, and Kamiseya Naval Security Group Activity. The overall project also included power facilities; a 350-foot steel microwave tower at Yokosuka; and concrete buildings at Camp Zama, Sagami Depot, and Camp Fuchinobe. Several contracts of approximately \$200,000 to \$300,000 each with individual Japanese firms and local joint ventures were used for this extensive communications system project.

During the same years, the District supervised some construction at Yokota Air Base. A taxiway and runway access there cost \$557,000; construction of the terminal and air freight building came to approximately \$470,000; and the Air Passenger Terminal, designed by OED in



Addition to school built at Wakkanai, Japan, 1968.

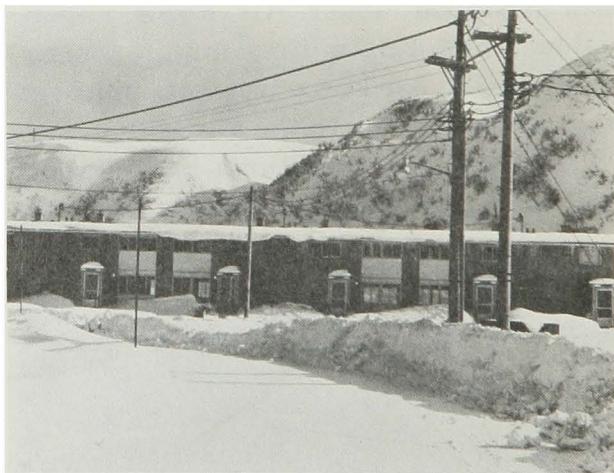
1967, was built for \$556,000. Housing rather than airfield improvements marked construction at Tachikawa Air Base; between 1964 and 1966 Japanese contractors built \$624,000 worth of officers' quarters and a \$308,000 airmen's dorm. Much of the District's Japan workload after 1963 consisted of jobs for the U.S. Air Force.

Naval installations in Japan also provided new work for FED after 1963. When a fire destroyed the operations building at Kamiseya in September 1965, the Navy asked FED to design and construct a new facility within 90 days. The District completed the design in less than two weeks, awarded the construction contract in late October, and turned over two of the four steel buildings to the Navy 65 days after that. The project cost approximately \$600,000. Atsugi Naval Air Station also received improvements: between 1966 and 1968 a joint venture of two Japanese contractors constructed a mine facility, an airfield lighting system, and parking aprons. The expansion of existing power plant facilities was included in the \$1.4 million contract. Local firms performed some construction at Iwakuni Marine Corps Air Station as well. Three enlisted men's barracks built between 1964 and 1966 cost \$641,000; airfield lighting, aircraft fuel storage, and electrical facilities constructed in 1967 totaled approximately \$828,000; the rehabilitation of certain storage and port facilities came to about \$412,000.

The addition of Air Force and Navy assignments thus resulted in a heavy workload in Japan. At the same time, the District's forces in Japan continued to service the needs of the U.S. Army. At Chitose, for example, Niitaka Company, Ltd. built barracks for 272 enlisted men, bachelor quarters for 59 officers, an addition to the mess, a post exchange, and a

bank, post office, and chapel. Construction took place between December 1965 and August 1967 at a cost of approximately \$1 million.

Accompanying this and earlier work at Chitose and at Wakkanai was the development of a program of prefabricated housing known as USAHOMES. These American-made homes consisted of two-story units joined side-by-side to form duplex, four-plex, or six-plex combinations; the buildings were built in the U.S. and installed with exterior utilities on the site. The first series of USAHOMES saw erection at Chitose in 1964; the fiscal year 1965 program then provided for an additional 60 units there and 80 units at Wakkanai. Some problems arose as shipping damage required unexpected repairs or additions on site. Nevertheless, these homes provided inexpensive Government housing in remote areas of Japan. FED's role in supervising the installation of the USAHOMES at Chitose and Wakkanai introduced the District to a new element of overseas construction.



USAHOMES installed at Wakkanai, Japan, 1968.

Army, Air Force, and Navy projects thus continued to keep FED busy in Japan. In addition to these tasks which were assigned via the annual fiscal year programs, several important projects for the

Far East District were included in the fiscal year 1966 Supplemental Military Construction Program (66-S). While OED constructed improvements at CCK, Kadena, and Machinato, FED built facilities at a number of sites near Tokyo in further support of the U.S. mission in Southeast Asia.

The conversion of U.S. Army facilities into military hospitals constituted an important 66-S task for FED. In 1965 the U.S. Army, Pacific (USARPAC) determined that the least expensive and most rapid means of providing needed additional hospital space would be through the use of existing Army buildings. The four sites selected for this program were Camp Oji, Camp Tokorozawa, Camp Drake, and Kishine Barracks. In December 1965 and January 1966 the District awarded A-E contracts to DMJM for the design of the Kishine and Oji rehabilitation; later in 1966 FED began combined A-E-in-house efforts with DMJM to design the facilities for Tokorozawa and Drake. The 38 days between the start of design and the start of construction at Kishine and the five and a half months for Drake were typical of the project's rapid design. The District also reached its goal of low construction cost, for the facilities at these sites cost an average of \$2,822 per bed and \$5.95 per square foot of floor space. In 1966 USARPAC eliminated the Tokorozawa site from the conversion project; in 1967 contractors completed the rehabilitation of facilities at Kishine, Drake, and Oji to provide a total 3,000-bed capacity. The cost for all three sites, including air conditioning installed in 1968, came to over \$5.1 million.

FED constructed certain of the earlier mentioned facilities at Yokota Air Base under funding from 66-S. In addition, three projects previously authorized under

normal programming were reassigned to 66-S because of their importance to U.S. support of Southeast Asia. Construction of an Autodin Message Switching Center at Camp Drake took place between September 1966 and October 1968; the contract with Mitsubishi Shoji Kaisha totaled \$552,000, and the project included an electromagnetic shielding enclosure for the 12,700-square foot operations area. The District also supervised the construction of POL mooring facilities at Koshiba and Hakozaki. During 1967 IMODCO of Los Angeles built terminals at both sites and installed a patented fuel oil buoy. The third project reassigned to 66-S involved ship-to-shore facilities at Yokosuka Naval Base, where from 1967 to 1969 a joint venture of three local firms built a new power plant, two diesel engine generators, a steam boiler, and electrical and steam distribution lines to docking areas. The entire project cost over \$2 million; the major contract totaled approximately \$1.1 million. Like the jobs at CCK, Kadena and Machinato, these projects in central Japan were constructed through the 1966 Supplemental Program in support of Southeast Asia.

The 1963 assignment of FED as construction agency for all the armed services in Korea and Japan and the additional work generated by 66-S, then, shifted the District's emphasis from Korea to Japan, where the heavy workload remained at the end of the Division's first decade. A few months later, political events directed most of FED's activity back to Korea, as North Korean agents crossed the Demilitarized Zone (DMZ) and attempted to assassinate the Republic of Korea's president, Park Chung Hee. Two days later North Korea seized the U.S. ship *Pueblo* in international waters off Wonsan.

These events of January 1968 produced an

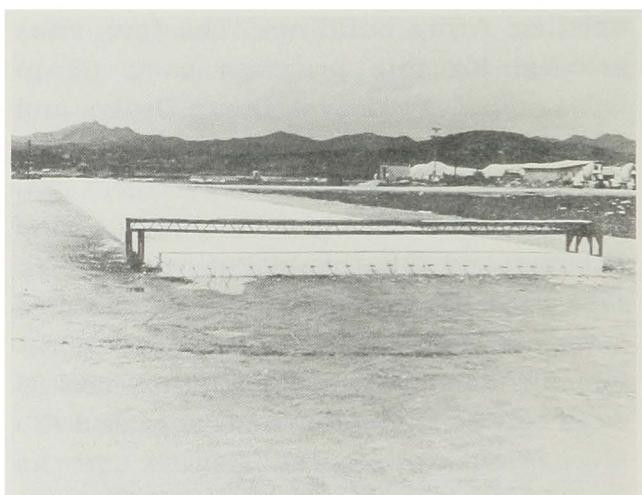
immediate determination to augment U.S. forces in Korea and consequently led to an urgent construction program to provide needed facilities for those forces. Part of this construction would be included in "Tab Vee," and Air Force program funded from MCP and operation and maintenance (O&M) sources. Under this authority in mid-1968 Korean contractors began upgrading the airfield pavements at Kunsan and Osan Air Bases. Meanwhile, in June 1968 Congress approved the fiscal year 1968 Supplemental Military Construction Program (68-S), which provided \$46 million for the Air Force and \$41.8 million for the Army in construction costs, which later added another \$9.7 million worth of projects, and which funded most of FED's Korean airfield, housing, and pipeline projects after 1968.<sup>4</sup>

Work for the Air Force under 68-S focused on five airfields. 22 August 1968 saw the award of the first 68-S construction contract, for \$6 million, to a joint venture of Vinnell Corporation and Hyun Dai. This contract provided for strengthening airfield pavements at Kwangju, Suwon, and Taegu Air Bases, while supplemental agreements covered similar work at Osan and Kunsan, where local contractors had already begun Tab Vee improvements. Subsequent contracts in 1968 and 1969 called for the construction of new alert stands, hardened aircraft shelters, runway extensions, and new power and maintenance buildings at these five sites.

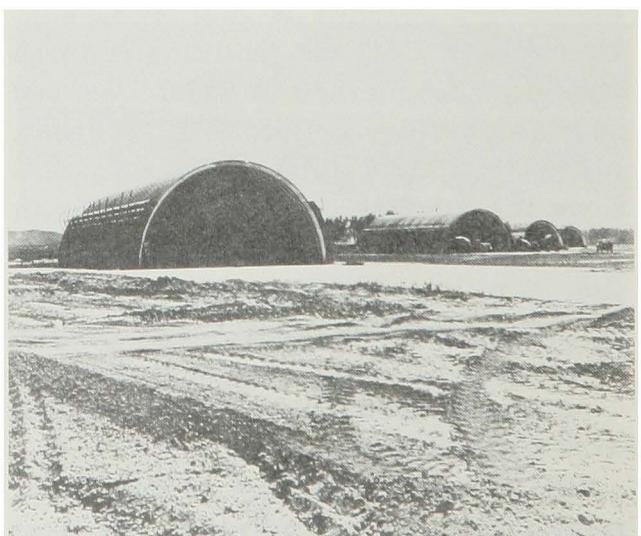
Both the Army and the Air Force received housing improvements under 68-S; the District supervised the construction of quarters for approximately 10,000 men at bases along the DMZ and at established camps throughout Korea. Also built as part of the 68-S program were depots and



Paving of Kunsan Air Base, Korea, under 68-S, autumn 1968.



Airfield pavement at Suwon Air Base, Korea, July 1969.



Aircraft shelters under construction at Kwangju Air Base, Korea, August 1969.



Troop housing built at Camp Stanley, Korea, early 1970.



68-S ammunition port facilities built at Chinhae, Korea, 1970.

storage facilities throughout Korea and a new port facility at Chinhae to handle increased ammunition shipments. Perhaps the most significant 68-S project involved the construction of a 250-mile pipeline running from Pohang to Seoul installed as part of a new POL system. Designed by the Bechtel Corporation in late 1968 under contract to FED, the pipeline was constructed by a joint venture of Stolte, Inc.; Santa Fe Engineers, Inc.; and the Korean Development Corporation. Jones and Laughlin Steel Corporation of Pittsburgh supplied the Government-furnished pipe. As of 30 June 1970 the estimated construction cost of the pipeline project, including storage and terminal facilities, was \$20.6 million. The comple-

tion of this POL system for the Army will eliminate the vulnerability of shipping bulk liquid POL products by rail or by road and thus, like the rest of the 68-S program, will aid efforts to defend the Republic of Korea against further threats from the north. The Legion of Merit awarded to Colonel John J. McCulloch for his duties as FED District Engineer from July 1967 to July 1969 and the September 1969 letter of appreciation from the Commanding General of U.S. Forces, Korea, attest to the importance of the FY 68 Supplemental Military Construction Program.

68-S thus moved the bulk of the District's activity to Korea, just as 66-S had assigned FED additional tasks in Japan. The Far East District's first decade has focused on this shifting balance of labor between the District's two areas of jurisdiction. More striking than geographical contrasts in the histories of POD's other two Districts, however, have been the distinctions between military and "civil" projects and the preponderance in both Districts of jobs for the military services. Each of the three Districts has operated in two major regions; each has undertaken a variety of design and construction tasks.

From the construction of radar facilities on Meck to the repair of the breakwater at Nawiliwili, from the improvement of airfield pavements at CCK to the design of Fukuji Dam, and from the rehabilitation of the Inchon locks to the installation of prefabricated homes in northern Japan, the projects supervised by these three Districts have brought diversity and challenge to POD.

## Chapter II

1. U.S. Army Engineer Division, Pacific Ocean, **Total Workload: Pacific Ocean Division FY 1958-1971**, 13 August 1970.
2. U.S. Army Engineer Division, Pacific Ocean, **Workload by Using Agencies—Cost - FY 1958-1970**, 11 August 1970.
3. Memorandum of Understanding between Pacific Air Force and Pacific Ocean Division Engineer, 23 April 1963.  
    Letter from Office of the Chief of Engineers to Pacific Ocean Division, 25 March 1963.
4. U.S. Army Engineer District, Far East, **Draft History**, 15 March 1970.

### CHAPTER III: The Division Adjusts

As a result of the various projects handled by POD's three Districts between 1957 and 1967, the Pacific Ocean Division has undergone a number of organizational changes. The assignment of new or the cancellation of old programs, consequent rising and falling District workloads, and shifts of emphasis within any one District have all affected the progress of POD. Leaving most of the details of District administration to histories of the Districts themselves, this chapter will discuss chronologically the major trends in the Division's organization during its first ten years. The history of POD has reflected the changing roles of HED, OED, and FED.

The first decade of the Pacific Ocean Division both opened and closed with the heaviest workload assigned to OED. Indeed, during most of this period the Okinawa District maintained the largest construction work placement of all three Districts. HED and FED each had a turn as "leader," however: HED's Nike program on Kwajalein brought the Division-wide workload to a new peak in 1961, while the amount of FED construction generated by 68-S eclipsed the level of concurrent activities elsewhere in the Pacific. Throughout the entire period, each District and the Division as a whole experienced fluctuations in workload, personnel, and organization.

The most obvious trend of POD's early years was the sharp reduction of personnel in the Okinawa District. At the time of its assignment to POD, OED employed almost 2,400 persons; a year later this had been cut to under 1,500. At the end of fiscal year 1959 the figure stood at approximately 1,000; two years later, employees numbered under 500. Except

for a slight increase around 1967 as a result of the 66-S program, OED's personnel strength has remained near 500.<sup>1</sup>

The number of Okinawa District employees declined drastically in the late 1950's primarily because of two developments. First, one of the District's major goals after World War II had been the rebuilding of the Ryukyu Islands. By 1957 OED had completed many of the needed improvements, now anticipated a decreasing workload, and consequently reduced its staff. A second factor in the District's personnel decline involved the growing self-sufficiency of local contractors. Whereas in OED's early years local constructors had required extremely close supervision, by the late 1950's the District could rely on the developing capabilities of Okinawan and Japanese contractors and needed fewer staff personnel for contract inspection. In the same way, as Government-furnished materials (GFM) became the exception rather than the rule and the District stopped its own production of construction materials, OED's Supply Division dwindled. Although the Okinawa District maintained its high workload during most of POD's first decade, it did experience sharp cuts in personnel.

In addition to this overall staff reduction, at least one administrative change worth noting took place in OED in the late 1950's. The District had maintained a Liaison Office in Tokyo to handle certain business transactions with Japanese contractors. Soon after the establishment of POD and FED, a Division survey team recommended that FED's Japan Area Office (JAO), rather than OED's Tokyo Liaison Office, perform those duties in

Japan on a reimbursable basis. As a result, POD General Order No. 3 dated 10 April 1958 directed the elimination of OED's Tokyo Liaison Office and the transfer of its functions to JAO, effective 13 April 1958. This reassignment early demonstrated the Division's flexibility in real-locating duties among its various Districts.

Two significant changes in the organization of the Far East District took place during 1959. The Japan Area Office established near Tokyo at the time of FED's assignment to POD was to administer all of FED's military construction in Japan and to handle some procurement and recruiting functions as well. In early 1958, then, FED found it necessary to increase its Engineering Division to meet accelerated MCA and O&M programs in Korea. More qualified local national engineers were available in Japan than in Korea; furthermore, Department of the Army civilian (DAC) personnel preferred duty near Tokyo to a tour near Seoul. For these reasons the Division decided to assign its new engineers to the Design Branch element of JAO rather than to the Korean headquarters of FED. These same factors—the availability of engineering talent in Japan and the Division's desire to attract American engineers—then led to the transfer of FED's Engineering Division from Korea to Japan in October 1959.

The presence in Japan of both the Japan Area Office and the Engineering Division of FED called for the establishment of an administrative body which would encompass both units. Thus the relocation of FED's Engineering Division was accompanied by the creation of the Far East Engineer District (Rear), whose components included JAO, the District's Engineering Division, and small rear detachments of the Budget and Fiscal, Supply and Contract Administration, and Office

Service staffs. FED (Rear) maintained its offices at Camp Oji until its move in 1965 to Camp Zama.

In a little over two years, then, those elements of the Far East District which were located in Japan had grown from a small Area to a District Rear Office. This expansion of the District's Japan forces heralded the staff study conducted in July 1960 on the possibility of a merger of the Far East and the Okinawa Districts. Lower costs were the goal of the contemplated consolidation: the Division estimated a savings of almost 200 civilian personnel spaces and approximately \$700,000 per year if the merger were effected. The study considered two major plans for combining the far east offices of POD: a two-District arrangement, with District headquarters in Japan and Okinawa and an Area Office in Korea; and a one-District plan, with the District Office in Japan and Areas in Korea and Okinawa. In calling for a District in Japan, both schemes acknowledged the rising importance of construction there, the recent relocation of FED's Engineering Division, and the establishment of FED (Rear). Proponents of the two-District plan cited greater responsiveness to using agencies and greater ease in recruiting local nationals as advantages of that arrangement; the predictable security of Okinawa as a U.S. military base also made maintaining a District there attractive. The study considered establishing a supporting District in Japan with operating Districts in Korea and Okinawa; a fourth alternative suggested a supporting District in Japan with an Area in Korea and an operating District in Okinawa. Although these plans would have emphasized Okinawa as well as Japan, they were deemed too expensive to carry out. Similarly, the Division rejected a plan for District head-

quarters in Okinawa with Areas in Korea and Japan because of the great distance between Okinawa and Korea. Japan rather than Okinawa would be the center of any single-District plan effected in 1960.

The merger scheme finally recommended by the Division Engineer, General Davis, called for the establishment of an Engineer District in Japan with strong Area Offices in Korea and Okinawa. This arrangement, General Davis noted, would save Government costs while providing for personnel continuity and Division flexibility. The Division Engineer recognized the probability of a reduced Division staff if POD were to supervise two rather than three Districts, but he concluded that the existence of the Division itself was not in jeopardy. "As long as the Corps is responsible for any substantial amount of construction in the Pacific Area," he noted, "there will continue to be...need for a division near Headquarters, USARPAC, PACAF, and PACDOCKS [Pacific Division, Bureau of Yards and Docks]."<sup>2</sup> Although this consolidation of POD's far east Districts into one office did not take place, the 1960 survey study paved the way for the merger of FED and OED which was effected ten years later.

The plan to combine the two Districts reflected, among other trends, an anticipated decline in workload throughout POD. To be sure, the Nike program in Kwajalein sharply increased the Division's overall responsibilities in 1961: during Major General Gerald E. Galloway's tour as Division Engineer, the total POD workload rose from \$71.9 million in fiscal year 1960 to \$132.2 million in fiscal year 1961. Soon after this, however, activity declined; the Division workload figures for fiscal years 1962 and 1963 were \$88.2 million and \$48.7 million respectively. Division-wide personnel in the meantime had

been reduced from approximately 2,160 in mid-1959 to under 1,300 in early 1961. To some extent this slump stemmed from the slower pace in FED; between fiscal years 1959 and 1963 the Far East District's annual workload shrank from over \$27 million to approximately \$11 million. Yet most of the decline of the early 1960's resulted from the anticipated completion of HED's Nike-Zeus construction program. By 1962 PMZ had built almost all the major Nike-Zeus facilities at Kwajalein, and in July of that year the Army successfully fired a Zeus missile from the Kwajalein launch site. The consequent lull in HED's construction activity between 1961 and 1963 was mirrored in the District's shrinking workload: \$70.1 million in FY 61; \$37.7 million in FY 62; and \$11.8 million in FY 63.<sup>3</sup>

Among the steps taken by POD to adjust to this Division-wide workload reduction in the early 1960's were the mergers of certain functions of HED and the Division organization. In accordance with POD General Order No. 4, issued the previous day, on 1 July 1962 the functions, personnel, and files and records of three HED offices were transferred to the corresponding units of POD. The Office of the Comptroller, the Office Service Branch, and the Real Estate Division of the Honolulu District were thus abolished and their duties were assigned to the Division. POD General Order No. 2 of 26 December 1968 reestablished HED's Office of the Comptroller; the other two offices have remained as units of POD and have continued to service the Honolulu District.

In addition to combining the functions of these three offices, the Division eliminated its Technical Liaison Office (TLO) and, for a short while, the District's Supply Division. Previously, POD and HED TLO tasks were handled by a full-time Tech-

nical Liaison Officer; now in 1962 the TLO position was cut from the POD roster and all Division and District TLO duties were assigned as a part-time function of the Division Engineer's secretary. This arrangement continued until February 1969, when a separate, full-time TLO was established for the Honolulu District. In the meantime, on 1 February 1963, POD General Order No. 1 abolished HED's Supply Division and transferred its functions to the Supply Division of POD. Although this merger lasted only until September 1963, when HED's supply branch was reestablished, it illustrated dramatically the cutbacks taken in the early 1960's to adjust to the diminishing workload. Division Engineer Colonel Stephen E. Smith even considered integrating POD and HED construction functions, a move which would have left the District with only its Engineering Division and the Office of Counsel. As it was, for several months in 1963 these two branches and its Construction Division were all that remained of HED.

From 1963 through 1966, the Division's growth remained relatively steady. HED's annual workload averaged about \$14.5 million during those years; all but \$2.2 million was in military construction, and most of that \$12.3 million went for Nike work in the Marshall Islands. The Far East District's activity showed a slight rise from 1963 to 1966, as its total workload gradually increased from \$11.9 million in fiscal year 1963 to \$25.7 million for fiscal year 1966. Still the busiest of the three Districts was OED; even before the boom of 66-S, the Okinawa District's annual workload had shot from a low of \$24.9 million in fiscal year 1963 to \$39.7 million in fiscal year 1966. A slight increase in construction activity thus characterized the Pacific Ocean Division between 1963 and 1967.<sup>4</sup>

Towards the end of this period, while Colonel Walter L. Winegar served as Division Engineer, FED underwent several important organizational changes as a result of its new focus on construction in Japan. In fiscal year 1966 work placement in Korea was approximately \$11.9 million and that in Japan \$11.8 million; the following year the same workload in Korea fell to \$8.1 million while the figure for Japan rose to \$12.2 million.<sup>5</sup> In March 1967 the District's 37 active contracts for 16 different sites in Japan covered USAHOME installation, hospital conversion, and new Autodin construction as well as a variety of other tasks. The District's 1963 assignment as DOD construction agent for all the armed services in Korea and Japan and the new work assigned under the 1966 Supplemental Military Construction Program had generated this boom in Japanese construction. To handle the increased workload most efficiently, in the spring of 1966 the Construction Division of the Far East District was transferred from Korea to Japan. At around the same time, the Division procured space in the U.S. Army, Japan (USARJ) headquarters building at Camp Zama for the FED (Rear) office, and the move there by early 1966 provided the faster communication now necessary between the Corps and USARJ. As further evidence of the growing construction program in Japan, in early 1968 the Division contemplated moving the Far East District itself to Japan and downgrading the Korea office to an Area. The DMZ and *Pueblo* incidents which occurred just then redirected FED's interests to Korea, and the plan received no further consideration at that time. The idea, however, as well as the relocation of FED's Construction Division and the expansion of the FED (Rear) Office, reflected the predominance in 1966 and 1967 of the District's work

in Japan.

The same 66-S program which increased activity in Japan also helped spur OED's move from old quarters at Camp Kue to a new building in Ojana in February 1968. The two-story, reinforced concrete, H-shaped structure leased by the U.S. Army has provided comfortable and efficient office space for the expanding Okinawa District. The move to Ojana constituted one of the few significant changes in OED's administrative procedures between 1957 and 1967. While certain functions of HED were combined with those of POD, and some elements of FED in Korea were shifted to Japan, during those years the organization of the Okinawa District remained basically the same.

By early 1968, then, the Division's activity had stabilized under Brigadier General Edward T. Podufaly and POD foresaw no major administrative reorganizations. The incidents in Korea which led to 68-S, however, also prompted new plans for FED as construction loomed in Korea. July 1968 saw the reorganization of the Far East District's Engineering Division: the Division Chief's office, the Technical Review Branch, and the Special Projects Branch were all relocated at FED headquarters. These elements remained in Korea until December 1969, when 68-S activity had slowed down and the Engineering Division was once again established in Japan. Less than a month after the transfer of FED's Engineering Division from Japan to Korea, on 1 August 1968 the District also moved its Construction Division back to District headquarters, and the Safety Office followed on 1 November 1968. FED's staff increased by 60% for the 68-S program alone, so that as of 30 November 1969 the Far East District had over 700 employees, while

OED's numbered under 500. Of the 700 on the rolls of FED, over 500 were stationed in Korea.<sup>6</sup>

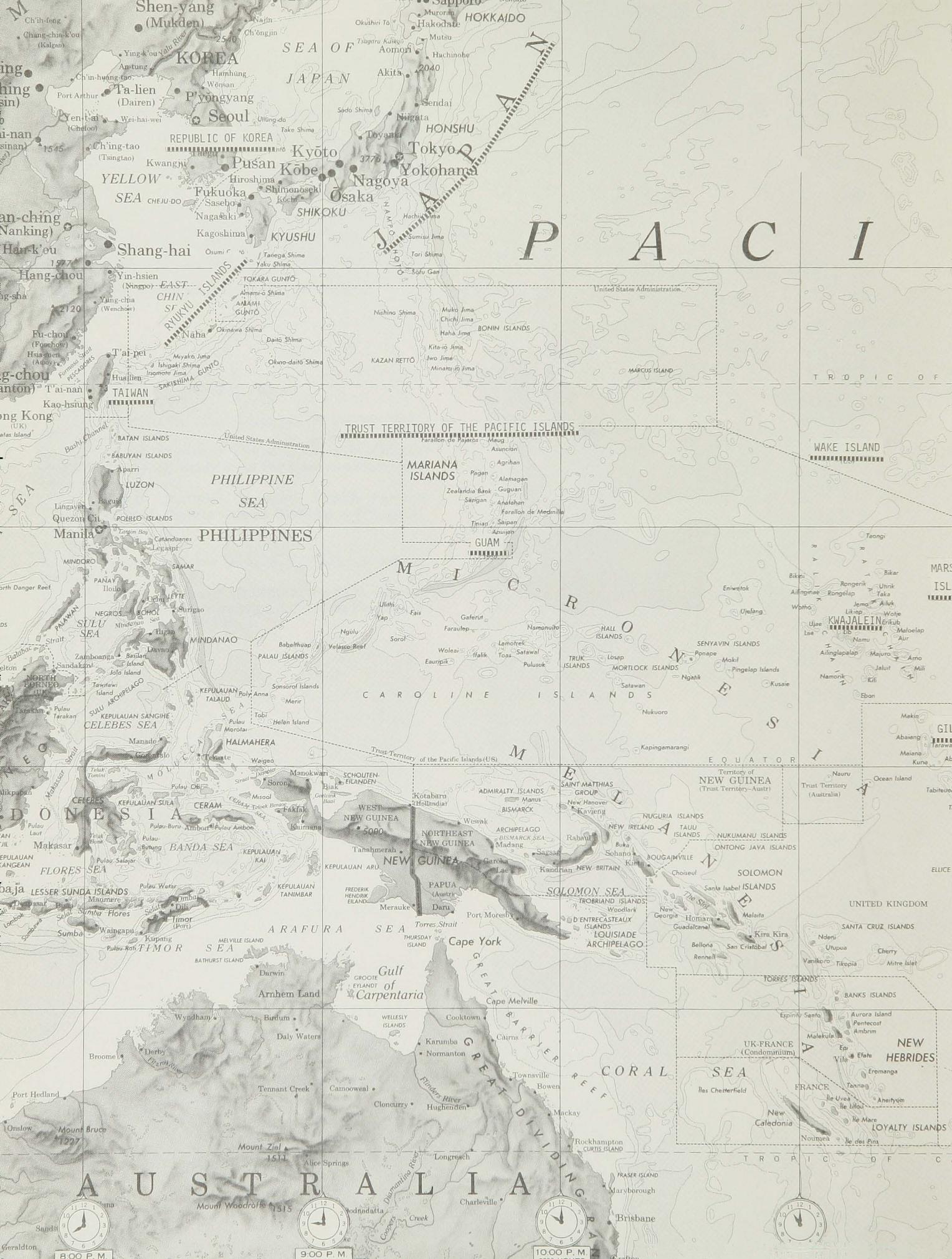
The Division's forces had no sooner increased to handle the heavy 68-S workload than the supplemental construction program neared completion. At the same time, the United States entered a period of economic recession, announced its intention to withdraw many of its forces from Southeast Asia, and agreed on terms for the eventual return of Okinawa to Japan. As a result of these developments, and in accordance with plans for Corps-wide retrenchment, during 1970 Division Engineer Brigadier General Curtis W. Chapman, Jr., issued orders for the mergers of POD's three Districts. On 1 July the Honolulu District was abolished and its staff combined with that of the Division; the Honolulu District Engineer became the POD Deputy Division Engineer for Mid-Pacific. On 1 October, then, FED and OED were merged into the Office of the Deputy Division Engineer for Western Pacific with headquarters in Okinawa and smaller offices in Korea and Japan. The consolidation of the Districts reflected the comparatively slow pace of construction in 1969 and 1970.

This recent merger and retrenchment and the dramatic increase in workload and staff generated by 68-S are sequels to the story of POD's first decade. From 1957 to 1967 each of POD's three Districts shaped the Division's progress: HED's Nike program increased the overall workload in 1961, while FED's work in Japan and OED's concurrent projects in Taiwan and the Ryukyus contributed to greater activity in 1967. Throughout this period POD adjusted to its Districts' fluctuating workloads by reorganizing certain administrative functions. Early cutbacks in OED personnel; the relocation of FED's

Engineering Division, first to Japan, then to Korea, and later back to Japan; and the 1962 merger of three HED/POD offices were all carried out in response to new situations. In the varied missions of each District, in the wide range of projects supervised, and in the organizational changes effected throughout POD, overseas construction has provided the Division with diversity and challenge.

### Chapter III

1. U.S. Army Engineer District, Okinawa, **Unit History: 1946-1965**.
2. U.S. Army Engineer Division, Pacific Ocean, **Staff Study: Reorganization of Far East and Okinawa Districts**, July 1960.
3. U.S. Army Engineer Division, Pacific Ocean, **Total Workload: Pacific Ocean Division - FY 1958-1971**, 13 August 1970.
4. *Ibid.*
5. U.S. Army Engineer District, Far East, **Briefing Data**, March 1968, p. 4.
6. U.S. Army Engineer Division, Pacific Ocean, **Command Briefing** for Lieutenant General Frederick J. Clarke, 10 December 1969.





## **PART TWO**

### **POD IN PERSPECTIVE**

## INTRODUCTION

In supervising projects for a variety of clients throughout a large geographical area, the Pacific Ocean Division has met many challenges during its first ten years. Three characteristics in particular of Pacific Ocean construction have affected POD's history. The geographical environment of POD's area of operations, first of all, has been responsible for such interesting projects as tsunami protection studies and rock-fill dam construction. New designs and unusual methods of building and supply have also stemmed from environmental conditions in the Pacific. A second factor distinguishing the Pacific Ocean Division's work has been its presence, not just overseas, but in foreign countries. This has led to unusual contracting procedures, such as frequent negotiation and the use of joint ventures of U.S. and local firms, and has challenged POD to adapt its supervising and inspecting methods to non-American cultures. Foreign languages and local traditions have called for special attention to safety standards and to the use of local construction materials. The Division has also had to consider International Balance of Payments (IBOP) regulations and other Government policies. Operating outside of the United States has affected POD's personnel decisions, too, as the Division has maximized its use of temporary duty assignments and utilized various recruiting techniques to attract American as well as local national employees.

Both geography and the special conditions of construction in foreign lands, then, have influenced POD's progress. A third factor shaping the Division's history has involved POD's work in areas politically vital to the United States. Hawaii houses the Pacific headquarters of the

Army, the Air Force, and the Navy; the Marshall Islands represent an important link in the Pacific defense system; Taiwan and Korea symbolize free-world policy commitments; and Okinawa and Japan serve as jumping-off points for U.S. aircraft and Naval vessels operating throughout the Pacific. Furthermore, the first decade of the Pacific Ocean Division has coincided with increasing U.S. interest in these and neighboring lands. As one consequence, much of POD's work in Hawaii, Okinawa, Korea, and Japan has aimed at providing housing and other base facilities for U.S. military personnel. The development of water resources in Okinawa, the drilling of wells in Korea, and the conversion of barracks to hospitals in Japan exemplify the unusual projects handled by the Division as a result of the strong U.S. military presence in POD's area of jurisdiction. New political developments in the Pacific have also affected POD, as the Division's construction programs have waxed and waned according to current events. New Nike defense decisions created first a boom and then a lull in Kwajalein; provocations near Quemoy and Matsu led to airfield construction in Taiwan; U.S. efforts in Southeast Asia and actions by the North Koreans required sudden build-ups by the Okinawa and the Far East Districts. Because POD's areas of operation are so important to the United States, the Division's jobs have often followed worldwide political currents.

The first three chapters of this section will discuss the effects of these three factors on POD's unusual history: the influence of Pacific Ocean geography; the nature of construction in foreign lands; and the consequences of POD's presence

in regions vital to United States policy. Chapter Four will then consider the Division's real estate activities from 1957 to 1967, for this aspect of POD's work has reflected the influence of all three factors. From these unusual circumstances of construction in the Pacific have come ten years of variety and challenge for POD.

## CHAPTER IV: Pacific Ocean Geography

Certainly the geography of the region in which POD has operated has introduced the Division to unusual and challenging tasks. Climatic conditions, terrain, and the size of the territory covered by POD have been among the factors shaping the Division's work. As a result of the environment, POD has been involved in many different types of projects not usually handled by the Corps of Engineers. Those projects in turn have often taken interesting directions because of geography, as unusual weather conditions have led to new features of design. Even some construction techniques have been altered to fit specific geographic circumstances. Also challenging has been the matter of communications and transportation among the Division's scattered offices. In these ways, geography has shaped the development of POD.

To a great extent, the variety of POD's work can be traced to the effects of environment, for the weather, landscape, and other features of geography have led to the Division's participation in many different types of construction. In the area of civil works, for example, although almost all Corps Divisions handle navigation projects, those supervised by POD have been smaller in scope and more unusual in nature than the norm. Hawaii has no large rivers and only one navigable stream, and her coastline is relatively short.

As a result, HED's civil works activities since 1957 have focused on flood control, small boat harbors, and beach erosion protection rather than on the development of major ports. Even these projects have been limited in scope: whereas mainland flood control projects often involve dams



Flood control improvements built at Hanapepe, Kauai, Hawaii.

and other massive devices, for example, Hawaii's efforts have required smaller levees and outlet channels. Because of the small drainage area at Hanapepe, for instance, flood control there included only a flood wall and levees each less than a mile long. Construction of this project cost approximately \$588,000; by way of contrast, flood control measures for some river basins in the northwest United States have ranged from \$20 million to over \$100 million in cost. Similarly, the small boat harbors built in Hawaii have indeed been small: that at Manele provided berthing for approximately 130 vessels at a total cost of under \$700,000. The islands' short coastline also meant that by 1957 HED had already developed most potential deep-draft harbors; only Kawaihae saw new construction under POD. The development of many small civil works activities rather than the construction of a few large projects, incidentally, has meant higher

operating costs and Federal funding for "new" work.

The same environment which has resulted in many small navigation tasks in Hawaii has also introduced the Division to a number of unusual projects in both civil works and military construction. Among the more interesting civil works jobs undertaken because of Hawaii's geography was the study of tsunami protection for Hilo. The construction of the 4,000-square foot hydraulic model at Look Laboratory and the series of experiments conducted there involved the Honolulu District in some of the Corps' most interesting waterways activity. While the Big Island's southeast coast invites tidal waves, too, almost all the islands' shores are subject to erosion. Here again geography has determined the type of pro-

ject to be built by involving POD in beach erosion protection. The environment has also spelled out the specific steps to be taken to protect local beaches. On mainland coastlines, nearby mountains often replenish disappearing sand, but in Hawaii rapid erosion means that protection requires artificial sand placement and the construction of seawall barriers. Thus the Honolulu District recommended beach fill, groins, and a terrace wall at Waikiki, seawalls on Kauai, and sand placement and a breakwater at Haleiwa.

Kwajalein as well as Hawaii has been the scene of the Division's work with interesting projects as a result of geographic conditions. The limited size of the Kwajalein Atoll, for instance, required the contractors to create new land by dredging and fill operations before they could con-



Waikiki Beach, Oahu, looking north, 1970.

struct new technical facilities. While dredging is neither new nor unusual in Corps operations, its application here was to military construction rather than to civil works. Within the context of the Nike-X program, dredging and filling constituted an uncommon aspect of construction for defense research and development.

In POD's other two Districts, too, the environment has sparked the Division's participation in projects not usually attempted by units of the Corps of Engineers. Conditions in the Ryukyus, for example, have created shortages of both power and water. Because the islands lack coal and other natural resources, OED has had to build plants at Kin and Machinato to produce electric power; because Okinawa's water sources lie in the north, away from the centers of population, the District's work for RDWC has focused on storage reservoirs and pipelines. In Korea, likewise, the water well program to provide potable water for U.S. military forces sprang from the water shortage in Korea and from the anticipated availability of water in the land's crystalline rock—both, features of the environment.

Thus distinctive geographic conditions have assigned to POD a variety of interesting and often unusual projects. Furthermore, within those and other jobs the Division has often created new elements of design because of the weather, the terrain, and other aspects of local geography. At Nawiliwili and Kahului, for example, rough waves and violent storms called for frequent breakwater repairs and finally led to the barriers' rehabilitation. To compensate for the lack of large rocks, HED's Engineering Division conceived the concrete tribars which soon became a patented feature of breakwater design. Nike construction at Kwajalein has provided other examples of the influence of

geography upon design within POD. Since aluminum flashing on roofs would not stand up well in the humid and salty Kwajalein atmosphere, the engineers chose stainless steel for use as flashing components. Warehouses had to be dehumidified, too, and almost all technical facilities air-conditioned, to protect against the weather of the Atoll. In both Hawaii and Kwajalein, the environment has affected project designs.

This trend has been particularly noticeable in Okinawa, where the Division has constructed many stateside-type facilities in a Pacific Ocean setting. The Ryukyus' annual mean humidity of 79% means that metal buildings would require high maintenance costs, while the termite problem eliminates construction in wood. Not only for these reasons, but also because of the prevalence of earthquakes and typhoons, most designs have called for reinforced concrete or concrete block construction. Although only one typhoon per year usually hits the islands with full force, as many as 45 per season may storm the surrounding area. The accompanying salt-laden heavy rains rapidly corrode metal; winds of up to 170 miles per hour create extreme pressure changes which can cause buildings to collapse. Designing structures to withstand all these threats has often proved a challenge to POD.<sup>1</sup>

The design of the facilities at Camp Hansen, for example, called for precast and tilt-up reinforced concrete construction in 143 of the camp buildings. To manufacture the precast units needed for this \$10 million project, the contractors poured concrete into roof panel, wall panel, and frame moulds; released the cured pieces by compressed air; and transported the completed precast units by crane or trailer truck to the nearby building sites. This use of modern precast-



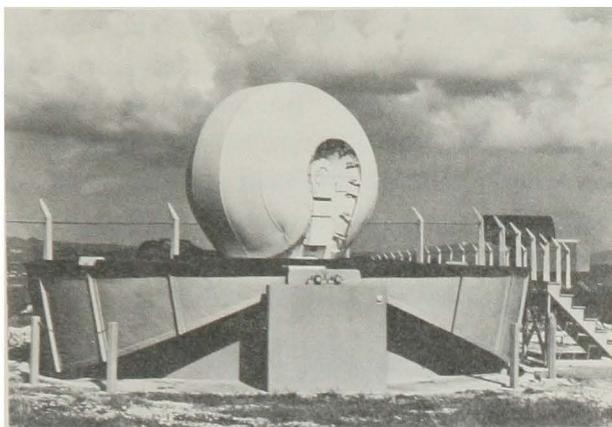
View of Kokuba Gumi's precast concrete yard installed at the construction site of Camp Hansen, Okinawa, in the early 1960's.

ing methods not only developed local contractor capabilities but also provided Camp Hansen with sturdy, typhoon-resistant construction.

Most of the other base facilities designed under OED's supervision called for similar materials. The series of chapels conceived of by Skidmore, Owings, and Merrill for various camps on Okinawa specified reinforced concrete frames, poured-in-place concrete floors, concrete block interior and exterior walls, and brick or decorative concrete block facades, in order to ensure resistance to earthquakes and typhoons. The 1,000-seat theater at Kadena provides another example; this award-winning design incorporated locally obtained coral in precast concrete panels engineered to withstand 180 mile per hour winds. The storage facilities built at

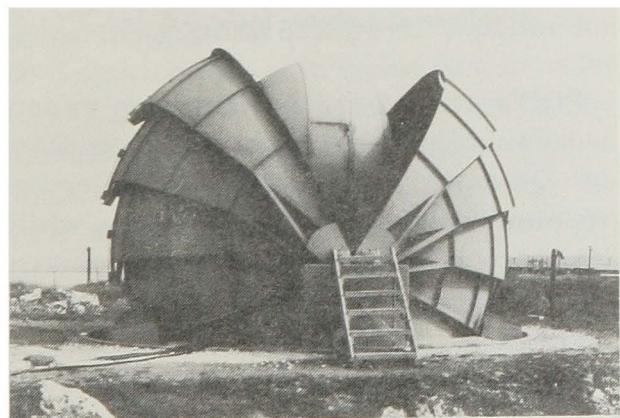
Machinato likewise utilized precast concrete partly because of seismic threats.

Okinawa's environment has thus inspired interesting innovations in base and camp design. The District has also had to consider the islands' susceptibility to typhoons in adapting Nike radar facilities to the Ryukyuan climate. Protecting Nike's sensitive equipment from rain and wind without impairing signal transmission and reception presented the engineers with a problem: the tough, permanent antenna covering which seemed necessary because of Okinawa's typhoon threats would reduce the effectiveness of the radar. OED's Engineering Division Chief, Adrian Roggeveen, solved the dilemma by devising a "clamshell" protector modeled roughly after telescopic fire ladders. Somewhat like the folding



One of the Nike radars constructed on Okinawa around 1960. In this picture the "clamshell" cover is completely open, exposing the radar itself.

hood of a pram, the collapsible cover was designed so that as each section rose it pulled a lower section behind it and then was dropped off. The model created by OED's Engineering Division consisted of two half-sections composed of segmented steel panels; a system of cables and pulleys opened and closed the "shell." The radar could operate with the cover retracted in winds up to 60 miles per hour, at which point the shell would be raised so the equipment would sustain gusts of 200 miles per hour. Especially attractive was the speed with which this collapsible cover could be opened and closed. While other all-weather protective devices required four or six hours to be dismantled



"Clamshell" covering closing around the Nike radar.

or reassembled, OED's "clamshell" could be raised or lowered electrically in just over a minute. This feature significantly minimized the equipment's non-operational time. The in-house design of the Nike "clamshell" constituted one of OED's most challenging engineering tasks.



Close-up of the cable and pulley system which operates the Nike "clamshell" cover.

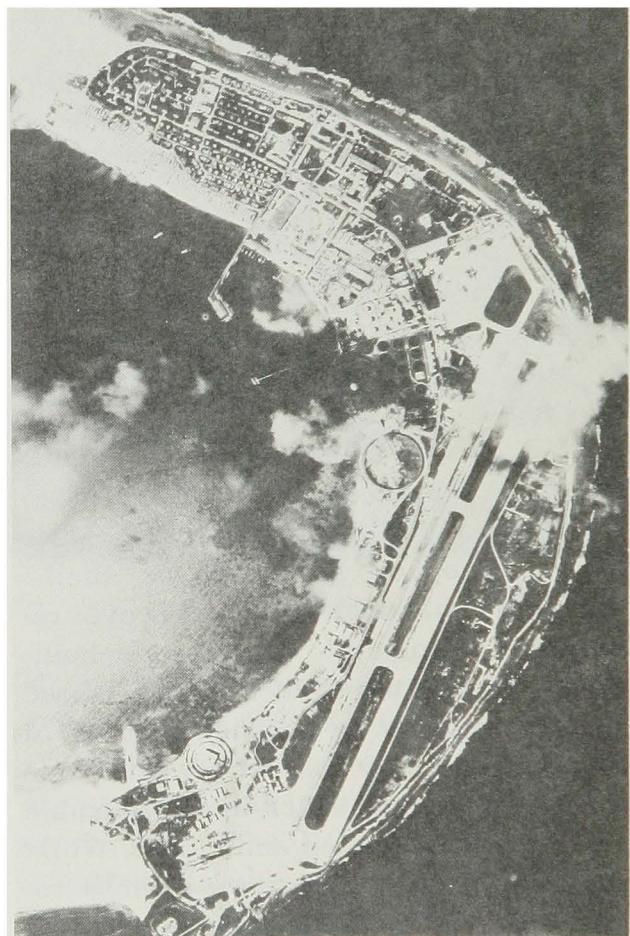
Out of the need for special designs to withstand Okinawa's typhoons has evolved an unusual relationship between the District and local A-E firms. OED has provided quarters and logistical support to two existing A-E's with reimbursement for these facilities and services reflected in adjusted fees for the designers. Although urged to broaden its base of A-E firms on Okinawa, OED has stressed

the importance of maintaining established A-E offices because of the unusual designs required to meet earthquake and typhoon conditions.<sup>2</sup> The experiences of the Okinawa District as well as many projects of HED illustrate the far-reaching influence of geography upon POD design.

The environment of the Pacific Ocean has thus created unusual assignments for the Division and has kindled interesting designs. These same climatic conditions have also encouraged POD to adopt new methods of construction. The weather itself and the isolation of many of POD's construction sites have made building in the Pacific a challenge. Breakwater construction at Kahului once again exemplifies the Division's experiences. Here geography not only prompted the use of concrete tribars but also affected the progress of the barriers' rehabilitation. In March 1964 HED awarded a contract for the casting of 1,092 tribars, and a second contract signed in January 1965 marked the start of tribar placement. Only weeks later, however, high waves seriously damaged the breakwater, necessitating modifications to the first contract to provide for the casting of 131 additional tribar units. Nor was this the only occasion on which storm waves interrupted construction on the Kahului barriers: high waves in December 1968 hampered repair of a breakwater section which had been damaged only three months before.

Also affected by geographic conditions was the erection of the bascule bridge at Honolulu, where the tsunami of 23 May 1960 inflicted enough damage to require a temporary halt in construction. HED has experienced similar problems in building on Kwajalein. Southwesterly winds with high tides tend to "pile up" the water in the main island's lagoon, and on at least two occasions between 1962 and 1965

high water caused flooding and displacement of riprap along the shoreline and piers. Because of the brackish water underneath the islands, too, construction workers found it difficult to excavate to more than five feet in depth. Kwajalein's climate, like Hawaii's weather, has made construction a challenge for HED.



Aerial view of Kwajalein Island, July 1964.

POD's other two Districts have experienced similar conditions. At Tengan Dam in Okinawa, for example, inclement weather meant construction delays, while heavy rains affected the critical moisture control necessary for embankment placement. The Far East District has had to meet a challenge not faced by HED or OED: extremes of weather and consequent short working seasons. In most of

Korea and in much of northern Japan, construction ceases in January, February, and March. This means that if work can begin in July the building will be under cover when late autumn brings stormy weather, and contractors can complete the interior during the winter months. When a construction start is delayed until October, however, workers have only a few months to build, and the project must be halted until spring. Thus the harsh weather of Korea and northern Japan places great importance on the starting date of construction.



School in Japan under construction during winter of 1965-66.

Occasionally, FED has had to continue construction even during the winter months. New facilities were built in Japan during the winters of 1965 and 1966, for example, in spite of cold weather and snow. Installation of the POL pipeline for 68-S also took place in the winter, in order to avoid the rice planting season in the spring, and construction crews had to work in extremely cold weather to lay the pipe in frozen rice paddy soil. In addition, the corrosive Korean atmosphere called for a metal coating on the pipe itself, and this then required special handling techniques when moving or installing the pipe. The climate has had a great influence on construction procedures in

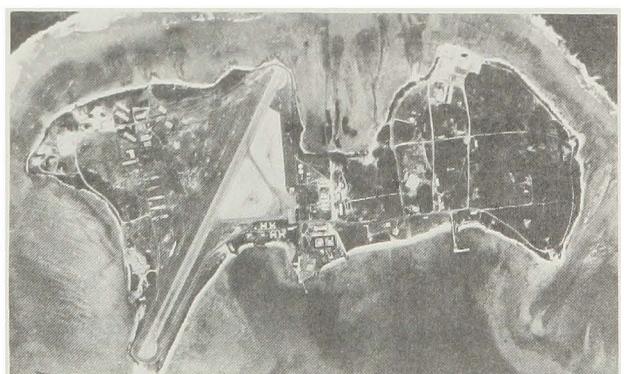


Snow surrounding partially completed commissary addition in Japan, mid-1960's.

Japan and Korea as well as in the other regions under POD's command.

Other geographic features, such as the isolation of many POD project sites, have shaped construction in the Pacific, particularly on the islands in the Kwajalein Atoll. Roi-Namur had attracted so little traffic since World War II that contractors had to remove over 90 coconut trees from the prospective runway before paving the airfield in 1960. Dense jungle growth on even more isolated Ennylabegan presented a similar problem. Because of their remote location, these islands offered few accommodations for arriving Division and contractor personnel; early work for Roi-Namur therefore included supervising the rehabilitation of a barracks craft to provide berthing for construction crews.

Procurement proved to be one of the



Aerial view of Roi-Namur Island, Kwajalein, in 1967.

more obvious construction problem areas affected by the isolation of the Kwajalein Atoll. Shipping schedules were uncertain, and storing supplies on the main island until they could be reshipped within the Atoll required additional warehousing space, manpower, and time. In late 1960 a supply-laden barge bound for Roi-Namur capsized and sank in rough seas. Although the loss did not delay the completion date of Project PRESS construction, the incident illustrates the unusual construction conditions POD has faced because of Kwajalein's remote location. Also representative of the special construction tasks required by geographic isolation was the 40-mile pipeline built from Okinawa's Ishikawa Treatment Plant to the remote site of Fukuji Dam. The great distances between Okinawa's northern water sources and her southern population centers have called for the construction of similar lines throughout the island.

While Kwajalein offers the best examples of unusual construction techniques adopted because of geographic isolation, activity within all three Districts and in the Division itself provides evidence of the many communications and transportation problems created by that same factor of remoteness. POD's geographic boundaries encompass eight and three quarter million square miles, an area equal to two and a half times the continental United States. Yet, only three per cent of this territory is land. Sending messages and traveling across wide stretches of ocean have created many challenges for POD.

Communications between the Division and either of its two far east Districts, first, have involved what General Davis once called "all the problems of command by remote control."<sup>3</sup> The Division's location in Hawaii places it at the transpor-

tation and communications hub of the entire Pacific area; POD's proximity to USARPAC, PACAF, and PACDOCKS has enabled it to deal directly with the commanders of its principal military customers. Since Hawaii lies closer to the rest of the U.S. and hence to OCE than does any far east city, locating the Division headquarters in Honolulu has facilitated the recruitment of key personnel and the procurement of critical construction materials from the mainland. Yet POD's residence in Hawaii has put it 4,700 miles from OED and even farther from FED. Both POD's office and its overseas Districts have felt the results of this situation in the area of intra-Division communications.

All mail is sent by air, first of all. Telephone calls are placed via Autovon and are thereby limited to non-classified conversations. Because POD shares local Autovon lines with the many military commands headquartered in Hawaii, furthermore, it holds a low priority on the use of the lines; calls to Okinawa or Korea may take up to three hours to complete. Also complicating telephone communications is the five-hour time change between Hawaii and the far east. POD personnel must wait until 1245 or 1300 to call OED or FED, which are just then opening their doors, while employees in those District offices have only until 1100—1600 in Honolulu—to reach POD. In addition, the international date line divides the Division from its far east offices. This means that on Friday in Honolulu it is already Saturday in Okinawa, Taiwan, Japan, and Korea; conversely, the far east Districts' Monday coincides with Hawaii's Sunday. Thus the work week in which the Division can communicate easily with its far east Districts is effectively narrowed to four days.

The effects of the international date line have also made travel between POD and any one of its far east offices a considerable challenge. Neither commercial airlines nor military craft fly directly from Honolulu to Seoul, to begin with; passengers are routed via Tokyo or Taipei, and the extra stopover usually takes up half a day. The seven-hour flight between Hawaii and Japan normally requires a brief recuperative period at the traveler's destination, while the customary stopover in Guam en route from Honolulu to Okinawa means additional non-working time. Consideration of the date change further complicates travel plans: staff members often try to schedule their departures from Hawaii for Saturday so as to arrive in the far east on Sunday and have one day to recover from the flight; personnel leaving the far east in the middle of the week will have an extra day of work on arrival in Honolulu. Communicating and traveling from Division to District has not always been an easy task.

Nor has communication among POD's far east Districts been without its trials. All teletype messages between Korea and Okinawa must be rerouted through Japan; none of POD's far east offices has its own encrypting equipment, furthermore, so that messages are sent through the nearest Army command: Eighth U.S. Army in Korea, USARJ in Japan, and USARYIS in Okinawa. Poor connections typify voice communications between Korea and Okinawa, while the lack of direct flights between Seoul and Naha means a stopover in Japan or Taiwan. Similar difficulties have occurred in communicating between FED and FED (Rear). This was a special problem from 1959 to 1966, when the District's Construction and Engineering Divisions were separated by the Sea of Japan. The various mergers

planned throughout the decade for POD's far east Districts reflect the Division's recognition of the difficulties of trans-Pacific communications.

Even within each of POD's three Districts, the island nature and the geographic range of their operations have created unusual conditions of communications and transportation. Mail overseas is often slow and telephone connections costly and occasionally garbled.

Transportation within each District offers other challenges. Even in Hawaii, for example, traveling from one project site to another can involve considerably more than a short drive by Government vehicle. Since military flights are not available, personnel traveling from Honolulu to any of the outer islands must make the 80- to 300-mile trip via one of two commercial airlines. Renting a car on the outer island means additional inconvenience and high costs. No commercial flights run between Honolulu and Kwajalein; since military charter planes make the 2,400-mile flight about three times per week in each direction, the flight schedule often determines the length of time spent in the Atoll. Similar conditions apply to travel between Okinawa and Taiwan, a route serviced once daily by commercial lines. Unlike mainland Divisions whose District personnel can drive to their Area and Project Offices, POD must rely on air transportation to carry its engineers to their scattered job locations.

These examples of intra-District travel all involve crossing water. The geographic isolation of many of POD's construction sites has also made transportation over land a frequent challenge. On Okinawa, for example, OED uses helicopters to lift its men over the 38 miles of forest between the District office and the site of Fukuji

Dam. FED has also found helicopters advantageous in Korea. Especially in its early years, when the Far East District's work was characterized by many small and scattered projects, FED needed rapid transportation throughout the country. Thus until 1966 FED maintained an Aviation Section of two or three helicopters to help reduce travel time from project to project. This activity was revived during 68-S to ensure the maximum use of limited personnel. As FED District Engineer Colonel Franklin R. Day noted then, with either rotary or fixed wing aircraft "you can send a man out, he can work four or five hours on the job, and be back that evening if you need him."<sup>4</sup> In Japan, ground transportation has usually been available, but even here the geographic spread between project sites has made travel a challenge for FED (Rear). Getting from Iwakuni in the south to Wakkanai in the north, for example, involves a long train ride as well as an airplane flight. All three Districts and the Rear Office of FED have experienced unusual transportation and communications requirements because of the great distances between their project sites.

In at least four aspects of POD's operations in the Pacific, then, the environment in which the Division has worked has tested the Engineers' ingenuity. The unusual geography of the Pacific islands has introduced POD to such unusual projects as the study of tidal wave protection and the generation of electric power, while climatic features like high humidity and susceptibility to typhoons have shaped the design of new structures throughout the Pacific. The tropical weather and the isolation of certain project sites likewise have affected building itself, as tsunami waves and coconut trees have interrupted actual construction.

Also influenced by the wide geographic range of POD's area of jurisdiction has been the field of intra-Division communications. The unusual circumstances of Pacific Ocean geography have contributed much to the history of POD.

#### Chapter IV

1. U.S. Army Engineer District, Okinawa, **Unit History: 1946-1965**, p. 7.  
R. L. Lansche, "Steel Overcoats Protect Instruments in Okinawa," November 1961.
2. **Command Inspection** of Pacific Ocean Division, February 1963.
3. U.S. Army Engineer Division, Pacific Ocean, "Mission, Organization and Functions," a briefing for Mr. Julian Hartt of the Los Angeles **Examiner**, 26 May 1958.
4. Letter from Colonel Franklin R. Day to Brigadier General Daniel A. Raymond, Director of Military Construction, Office of the Chief of Engineers, 20 June 1970.

## CHAPTER V: Construction in Foreign Lands

Construction by the Pacific Ocean Division has centered not only on far away places but also in foreign lands. POD's operations beyond the United States, like the physical environments in which the Division works, have resulted in several unusual features of Corps construction. POD's relationships with its contractors have often varied from those of continental United States (CONUS) Divisions, first of all; awarding contracts, supervising construction, and ensuring safety have frequently involved modifications of CONUS procedures. As a result, construction methods employed by POD have sometimes differed from those followed on the mainland. Supply measures have likewise been shaped by the Division's presence abroad. Both International Balance of Payments policies and the availability of local products have contributed to various supply methods in the Pacific Ocean Division. A third area affected by POD's operations outside the continental United States is in personnel. The recruitment of American talent, the employment of local nationals, and the use of non-Corps civilian personnel offices have all contributed to an unusual personnel situation in POD.

Although Hawaii is now one of the United States, many of the factors pertinent to POD's far east operations also apply to the Division's work through HED. Until 1959 the Hawaiian Islands held the status of a U.S. territory; Hawaii's culture comes as much from the orient as from the U.S.; and Kwajalein, a U.S. trust territory, shares many contracting, supply, and personnel problems with project sites in the far east. In all three Districts the Division has encountered unusual ex-

periences as a result of its extra-CONUS field of operations.

Consideration of contracting procedures outside the continental United States involves three factors: the awarding of contracts, the supervision and inspection required in foreign lands, and unusual features of construction resulting from building outside the U.S. Especially in Korea has the question of contractor capability created a challenge for POD. After 40 years of war and occupation, no true construction businesses remained in operation in Korea in the late 1950's, and the limited construction equipment available then was rented from firm to firm. Language presented problems, too, since many Korean contractors misunderstood designs and specifications, bid low, and then defaulted. The contractors' tendency to specialize and their inability to provide performance bonds have further complicated the awarding of construction contracts.

Because of these conditions prevalent in Korea in the late 1950's, the Division often relied on negotiated contracts rather than on formally advertised bids. As General Davis noted early in 1958, the weakness of the local construction industry made "mandatory some measure of negotiation to assure that we get a contractor who understands what we want him to build and who has the capability of building it."<sup>1</sup> Another result of the undeveloped condition of construction forces in Korea was the awarding of many small contracts. Part One has noted the large number of relatively small projects handled by FED in its early years. Had Korea's contractors been capable of handling large contracts, several of these small jobs might have

been combined into one large package. In fact, the opposite often occurred: each barracks building, BOQ, mess, and chapel was assigned to a different contract as large jobs were broken into smaller packages which Korean contractors could manage. Thus the completion of approximately \$2 million worth of basic facilities at the 1st Cavalry Division and the 7th Infantry Division in 1959 and 1960 required about 30 contracts for each site. At one point in the fall of 1960 FED was involved in over 500 separate contracts. Most contracts awarded by FED during 1959 and 1960 ranged from \$20,000 to \$100,000. At the same time, in contrast, each of the 12 contracts with Robert E. McKee, Nordic Construction, and Theo G. Mayer and Sons for Capehart housing at Schofield Barracks averaged \$1.8 million; PMZ's first contract for Nike construction at Kwajalein was awarded for \$3.3 million; and Kokuba Gumi began the construction of Marine Corps facilities at Camp Hansen under a single \$10.9 million contract.

Because Korea's contractors had not yet developed their capabilities, contracting there in the late 1950's was characterized by the award of many small contracts as well as by frequent negotiation.

Dividing up its projects into manageable contract sizes had further consequences for POD. For years FED's high supervision and inspection (S&I) cost percentages plagued POD; the ratio of design to construction costs likewise soared because of the large number of small-value contracts awarded, since almost as much work went into designing each small project as would have been expended on a large job. These figures reflected the additional work created by awarding, designing, and inspecting so many separate contracts. And undeveloped Korean con-

tractor capabilities may have been a factor in assigning much of the 1959-62 construction at Camp Carroll to troops of the 44th Engineer Battalion.

Even at that point, however, and certainly by 1963, local contractors had gained enough experience to handle larger contracts. The trend appeared as early as the spring of 1959, when Hyun Dai received a \$365,000 contract to build latrines and mess halls at Camp Casey and another award for \$392,000 for airmen's dorms and utilities at Osan Air Base. Between 1959 and 1961 the same company restored the locks at Inchon under a \$1.9 million contract. Hyun Dai continued to manage much of FED's construction in Korea throughout the 1960's.

In addition to developing local contractor capability, around 1963 the Division sought to improve the contracting situation by awarding a few large contracts to American firms. In 1964 and 1965, Stolte, Inc. handled a \$1.6 million contract for the construction of facilities at Osan and Kunsan. Between 1965 and 1968 the same company completed facilities at AC&W sites under a contract which began at \$4.6 million and eventually closed at \$8.2 million. By 1968 the occasional use of American contractors and the encouragement of the local construction industry had made the matter of contract awards in Korea considerably easier than it had been during the Division's first few years.

The sudden demands of the 68-S program then reminded POD that constructing in a foreign country is rarely as simple as building in the United States. Korean contractors had indeed developed basic construction capabilities, but they still lacked the expertise and management talents deemed necessary for a "crash" program of airfield construction. Ameri-

can industry was also understandably interested in the huge construction projects planned for 68-S. Thus POD sought approval from the Republic of Korea (ROK) Government to use American firms for certain 68-S jobs. In August 1968 the ROK-U.S. Joint Committee on the Status of Forces Agreement (SOFA) approved construction by joint ROK-U.S. ventures, and that month FED awarded a \$6 million contract to Vinnell Corporation and Hyun Dai for airfield construction at five Korean sites. In December of that year the District assigned a \$7.3 million contract to the joint venture of Stolte, Inc., Santa Fe Engineers, Inc., and the Korean Development Corporation for construction of the POL pipeline.

Awarding these large construction projects to joint American and Korean ventures created some additional problems new to Corps practice. Contractors from both countries had to cooperate fully with their new partners of foreign background, and fiscal matters relating to methods of payment and bonding often complicated operations. In spite of these difficulties, the use of joint ventures of U.S. and Korean firms provided a practical means of carrying out critical 68-S construction and also attested to the development of the Korean construction industry over the previous ten years.

In awarding contracts in Korea, then, the Division has met the challenge of an undeveloped local construction industry by using negotiation, by dividing large jobs into small contracts, and by involving American construction companies. Local contractors in other far east countries have proven capable of handling larger contracts than have firms in Korea. Even in Japan and Okinawa, however, the Division has had to cope with some degree of low contractor capability, especially in

the early years. Thus most of the contracts awarded by FED for ASA construction at Chitose between 1959 and 1961 were negotiated with the Ohki Construction Company. The amount of each contract ranged from just under \$95,000 to almost \$700,000; apparently this Japanese firm could handle larger jobs than could many of its Korean counterparts at that time. Yet the use of negotiation as prescribed for work in foreign countries and POD's reliance on one major firm for so much of its Japanese construction reveals the still undeveloped capabilities of the Japanese construction industry around 1960.

A somewhat healthier contracting situation has faced POD in Okinawa, where over 20 years of post-war occupation by the U.S. have helped develop local construction capabilities. The administration of Okinawa by the United States has eliminated many of the problems faced in Korea when U.S. contractors are involved; Okinawa's dollar economy and the prevalent use of English there have facilitated the awarding of contracts to both U.S. and Ryukyuan firms. For most projects on Okinawa, OED has issued competitive bids which result in fixed-price construction contracts. Thus OED's contract award procedures resemble those of most CONUS Districts far more closely than do FED's.

Until the end of the decade, however, the Okinawa District negotiated its construction contracts for work on Taiwan. Even many Okinawan contractors have not yet reached the level of the average U.S. firm involved in Corps construction. In 1964, for example, OED was working with seven Okinawan contractors with capabilities of under \$.5 million each; one with a capability of \$1 million; and only one who could handle contracts of \$5

million and over. Among the U.S. firms working for OED at the same time were two with \$1 million capabilities, two rated at \$5 million, and one capable of \$10 million projects. As late as 1966 the designers of the on-roof storage facilities at Machinato eliminated prestressed framing systems from consideration partly because of the lack of local contractor experience with such structures. Similarly, the awarding of so many small, separate contracts for 66-S construction at CCK may have reflected OED's efforts to adjust to local contractor capability. Although the construction industry in Okinawa and Taiwan has reached a higher level of development than has Korea's, even OED has had to consider local circumstances in awarding construction contracts.

The problem of undeveloped contractor capability has not affected the awarding of construction contracts by the Honolulu Engineer District, for HED has relied entirely on U.S. contractors for its jobs in Hawaii and the Marshall Islands. Yet in its work on Kwajalein the District has encountered unusual conditions which have led to modified methods of contracting for Nike construction. In 1959 HED advertised for bids for the first increment of Nike-Zeus facilities and awarded the \$3.26 million contract to the low bidder, Pacific-Martin-Zachry. Although the District had intended to advertise for additional construction, instead HED continued to add new work by negotiation so that the original contract totaled over \$50 million in 1962. The District also decided to negotiate the major contract for Project PRESS construction with Pacific-Martin-Zachry. The small contract for dredging on Kwajalein and Meck was advertised in 1963, with PMZ coincidentally emerging as low bidder. In 1965, then,

the Pacific Ocean Division Engineer appointed the Honolulu District Engineer chairman of an Ad Hoc Committee to determine contracting methods for future Kwajalein construction. OCE approved the committee's conclusion that the contractor's outstanding performance so far and the continued importance of Nike construction justified the retention of PMZ as prime contractor for HED's Nike work in the Marshall Islands. The new \$3.39 million contract awarded to PMZ (by then known as MZC) in December 1965 covered both carry-over work from the original Nike contract and new negotiated items. As of 1 January 1970 the amount of this new contract stood at over \$66 million.

Of the four Nike contracts, the first two were price redetermination contracts with redetermination downward only; the third was a firm fixed-price agreement; the fourth was a fixed-price incentive contract under which the contractor would be charged with 25% of all costs over the established target cost or credited with 25% of all savings under that target. The awarding of this series of contracts thus differed in at least four respects from standard award procedures. Only one prime contractor handled HED's Nike construction, first of all, and most of the contract work was awarded by negotiation rather than by advertising for bids. The first two contracts were price redetermination agreements, furthermore, a form of contract rarely used then and recently eliminated from Corps practice. Also unusual was the award of a fixed-price incentive contract in 1965.

Among the reasons for negotiating with PMZ were the contractor's proven ability to perform on schedule and the urgency of the entire Nike project. The potential logistical difficulties foreseen in bringing a new contractor's men and equipment to

the remote atoll also precluded real competition and encouraged HED to negotiate additional work with PMZ rather than to advertise new contracts. And additional work was added to the first contract by negotiation in order to save time and to ensure continuous construction at the start of the important Nike-Zeus project.

The contracts awarded in 1959 and 1960 were price redetermination contracts primarily because at that time the District was not yet familiar with the demands of this research and development program. Construction on a strange atoll of yet untested missile facilities could easily involve unanticipated costs. Thus HED preferred price redetermination contracts which established total price ceilings above which the District would not be required to pay. Familiarity with dredging and fill operations encouraged the District to award the third Nike contract as a firm fixed-price agreement. In assigning new construction for Nike-X, however, HED found itself once again in new territory. Uncertain sources of supply, questionable sources of labor, and the novelty of much of the new work led HED to negotiate a fixed-price incentive contract with MZC to accommodate anticipated contingencies and changes and to obtain a lower cost figure than would be possible under a firm fixed-price contract. An important consideration in all these contract awards was the remote location of the Kwajalein Atoll and the difficulties and uncertainties of construction in the Marshall Islands. Partly because of the Atoll's isolation, that is, HED's contract awards for Kwajalein have involved interesting procedures. The Division's challenges in this area have thus stemmed from two sources: the unfamiliar situation in Kwajalein and the undeveloped contractor capabilities of firms in the far east.

Both factors have influenced the Division's policies in awarding construction contracts.

Once awarded, these contracts required supervision and inspection by personnel of the Pacific Ocean Division. Like the awarding of the contracts themselves, this aspect of the Division's relationship with its contractors has been shaped by POD's presence in foreign lands. Especially in Korea, least touched of all POD's areas by American influence, the Division has experienced unusual circumstances in overseeing construction.

FED quickly found that close inspection of projects in Korea was necessary to ensure contract compliance. Korean contractors were unfamiliar with U.S. contracting methods and construction standards, especially in plumbing, heating, and wiring; construction workers were used to adapting each structure to particular conditions rather than building to specifications. The language barrier further hampered operations, while the shortage of modern equipment often forced Korean firms to rely on primitive tools. Because importing skilled labor from the



Korean women laborers screening aggregate for road construction at Taejon, Korea, in 1960. Compare this method of aggregate screening with the equipment illustrated in the 1969 photography of the Suwon batch plant on page

cities proved costly, Korean contractors tapped the local labor market for construction work on remotely situated projects. This usually involved on-the-job training while taxing both talents and tempers of POD inspection crews. The lack of performance bonds meanwhile eliminated the customary guarantee of completion. The following letter from a builder in the Western Pacific to a non-Corps agency vividly illustrates the situation also faced by POD.

SUBJ: Submit letter of Give Up  
Under construction Tenis Court.

Gentleman:

At the time we have this contract we thought we should able to complete this project to loan some amount of money from the bank. However at this time my company is almost craping condition at this time. Therefore I couldn't hire any-more labor because I can't pay labor charge under this condition, by the above foregoing information I am very sorry to said this but I have Give ups this job.

Request your kind consideration of this matter would be grealy appreciated.

Very truly yours.<sup>2</sup>

As a result of the Korean contractors' unfamiliarity with American construction methods during the Division's early years, POD had to exercise extremely close supervision over each contract. General Davis noted in the spring of 1958 that, "in fact, our inspectors must often act as 'straw bosses' to show them how to do that which they have contracted to do."<sup>3</sup> As late as 1967 a related situation faced the Division in Japan, where local

contractors occasionally delayed ordering items from the U.S. and where an insufficient work force sometimes postponed construction starts. This tended to push the contractors behind schedule and encouraged POD's inspectors to maintain a close watch over construction progress. General Chapman likewise has called working with foreign contractors "an educational challenge."<sup>4</sup>

Throughout the Division's first decade an area of great concern to POD's supervisors has been the field of safety. The Division's presence in foreign countries has led to inevitable difficulties of translation, first of all; native contractors have often misinterpreted safety instructions written in English. In Korea an additional factor has been centuries-old tradition, which understandably has withstood modern attempts at revision. The lack of strict labor laws of liability and compensation may have tended to relieve Korean contractors of a sense of responsibility for safe construction practices. In many cases poor safety procedures have resulted simply because local contractors have never before handled a particular piece of modern construction equipment. "Oriental fatalism" has also been cited by FED as a possible explanation of the Koreans' failure to demand high safety standards. Colonel Day has warned, "the natives will probably be doing things that the safety engineers didn't even think about when they wrote our safety manual."<sup>5</sup>

The Division has constantly tried to improve safety practices in all its Districts and has given special attention to construction in the far east. As early as its first year of operations FED's Safety Branch began issuing its English instructions with Korean translations to ensure that local nationals would understand the District's directives. Even more helpful

was the publication in the spring of 1963 of a bilingual Safety Manual which the Far East District distributed to Korean contractors and employees. In 1968 FED followed this up with a Japanese translation of the Corps of Engineers' General Safety Requirements (GSR) Manual, and two years later the District published a Korean translation of the GSR. New methods of supervision have also improved safety standards in the far east. Since POD's own safety office is located halfway across the Pacific from FED and OED, its members cannot make frequent inspections of far east project sites and offices. Since 1961, therefore, all POD personnel making staff visits to the far east have been asked to investigate safety procedures in their particular spheres of interest.

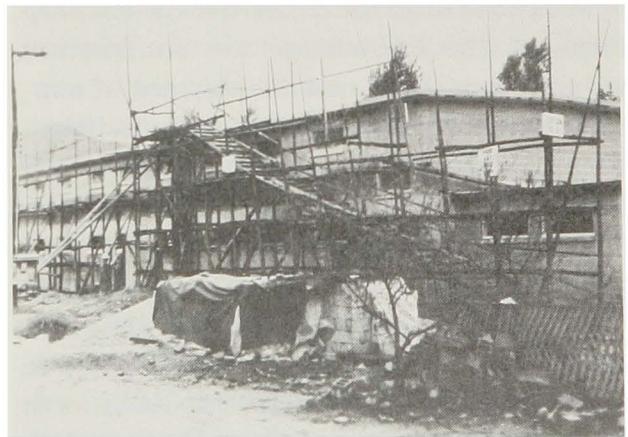


Scaffolding used in sandblasting operations in constructing tanks for liquid fuel storage at Kadena Air Base, Okinawa, 1967.

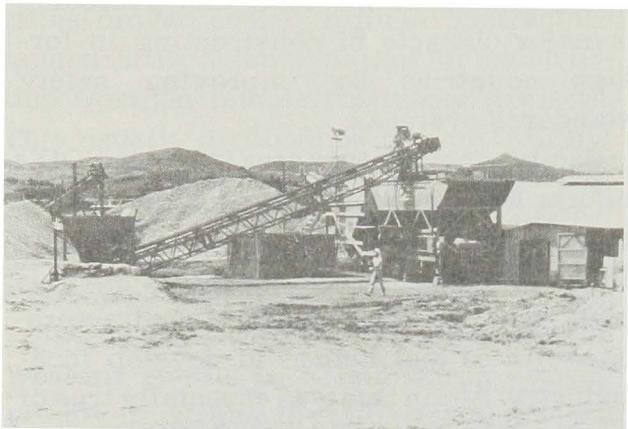
Thus POD has met the challenges involved in supervising safety practices in these foreign lands. In Korea the Division's efforts have resulted in the substitution of double-pole scaffolding; solid decking working surfaces also are now used extensively in Korea as well as in Japan. The presentation of the Division's 1963 annual Safety Award to the Far East District evidenced the progress

made in that arena. POD has overcome a major obstacle of constructing in foreign countries by improving safety standards overseas.

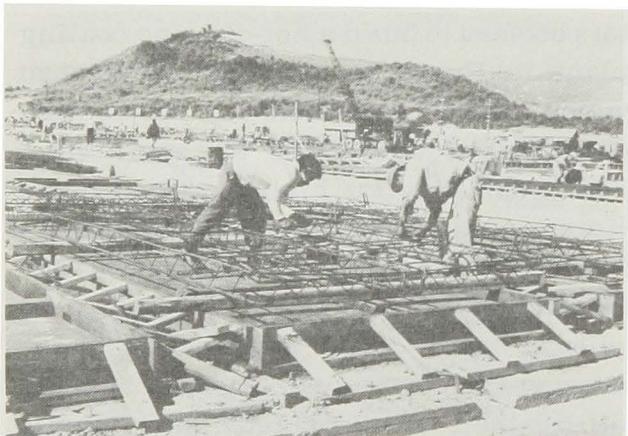
Safety is not the only area in which POD's efforts have improved local construction conditions. By insisting on high standards in every aspect of construction the Division has increased foreign contractors' capabilities and helped to develop local industry. Again this was especially true of construction in Korea, where the Division encouraged native firms to produce acceptable items for incorporation in Corps projects. As one result, Korean contractors decided to build a hot-dip zinc coating plant in Pusan to fabricate steel sash which would be suitable for use in U.S. construction jobs. Along the same lines, FED's demands for high quality led the Koreans to produce asbestos-cement board for roofing and siding. By 1964 the District was using only Korean-made piles in its pile foundation work in Korea; a few years later Korean contractors could utilize their own concrete batch plants on projects for 68-S. Even in Okinawa, where construction techniques stood approximately 20 years ahead of those employed in Korea, POD taught local contractors new methods of construction. Per-



Scaffolding used in construction of troop housing at Camp Casey, Korea, in 1969.



Contractor's concrete batch plant, at the construction site at Suwon Air Base, July 1969. To the left of the plant are facilities for washing and screening aggregates.

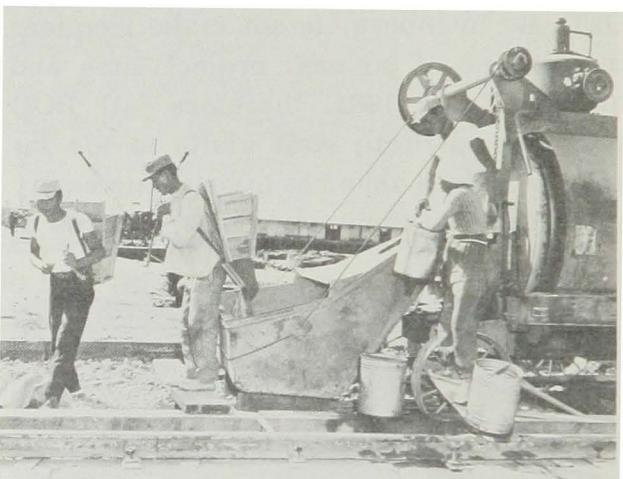


Placing and securing reinforcing steel in forms at the contractor's precast concrete yard erected at Camp Hansen, Okinawa, in the early 1960's.

haps the best example of this involved the precast concrete yard built and operated by Kokuba Gumi for construction at Camp Hansen. The knowledge the contractors gained from these new techniques of concrete casting reaped additional benefits in subsequent projects constructed by other local firms in Okinawa.

Thus POD's supervision of its far east projects has stimulated local construction industries in foreign lands. The development of local construction materials and the variations in contractor capabilities in these foreign countries have resulted in turn in some unusual features of construction. Perhaps to a lesser degree, but in the same way in which the geography of

the area has produced interesting construction techniques, the location of many projects outside the United States has flavored POD's construction. The use of relatively cheap local labor and materials, for example, has led to many unusual construction practices. Contractors working on KQ 502 airfield in Taiwan found it less costly to remove excavated materials in baskets on human shoulders than to import heavy equipment for the same job.



Concrete mixing operation used in connection with the rehabilitation of the dockside tracks at Inchon Tidal Basin, Korea, in 1958.

Similarly, Korean contractors relied on manual labor, not on elaborate machinery, for certain phases of the tidal basin project at Inchon. Aggregate screening was often done by hand for the same reasons. The Korean labor surplus and consequent high taxes on machinery importation also contributed to construction practices at Camp Carroll in the mid-1960's. There, workers lashed eight or ten four-inch poles together to form a mast of 12 to 14 inches in diameter which they used as a gin pole to lift a five-ton roof truss 25 feet in the air. Substituting this human labor for the motorized crane customarily used saved the contractors a considerable amount of money. Even as late as 1967, men rather

than machines were placing reinforcing steel beams on concrete slabs for 66-S construction at Kadena.

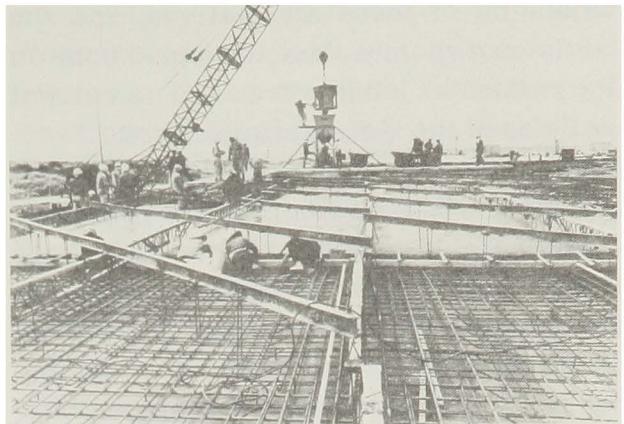
The use of local materials has led to an interesting feature of completed construction in FED: because of the scarcity of lumber products in Korea and the high cost of importing wood, many of FED's contracts have called for concrete block construction and cement tile roofs. Thus even the "semi-permanent" buildings erected throughout Korea have appeared to be of permanent construction—although their interiors have been finished on a "non-permanent" basis. Construction for as well as work by people of foreign cultures has likewise introduced POD to unusual features of construction.



Two-family duplex built for PROVMAAG-K in Seoul, Korea, in 1959, of concrete block construction with concrete tile roof.

The housing units built for the Marshallese on Ebeye Island in Kwajalein included one toilet for every multi-family dwelling and equally primitive bathing facilities—almost luxury by Marshallese standards, but hardly typical CONUS Corps construction.

Because much of POD's work takes place in foreign countries, then, The Division has experienced some novel construction techniques. For the same reason, POD has had to supervise its construction contracts closely, to ensure that language



Placing concrete and reinforcing steel for roof slabs of a liquid fuel storage tank at Kadena Air Base, Okinawa, in 1967.

difference and foreign customs do not interfere with Corps standards of construction or of safety. The Division has relied on local construction companies, furthermore, whose non-American background and inexperience in U.S. contracting methods have required close attention to contract awarding procedures. In each of these three aspects of the Division's contractor relationships, the fact that POD operates in lands outside the U.S. has created an interesting challenge.

The Division's presence in foreign countries has thus affected its construction and contracting procedures. A second area strongly influenced by POD's activity outside the United States has been that of supply and procurement, particularly for projects constructed through the Division's far east Districts. There are two basic alternatives to the problems of overseas procurement: POD might order necessary supplies and equipment locally, either through the (Usually foreign) contractor or through an American firm dealing in local products; or the Division could import the required supplies from the United States, either through private companies or as Government-furnished material (GFM). POD's supply activity overseas has required a constant

balancing of these alternatives, and the Division's choices have depended both on the particular job involved and on current policies of the U.S. administration.

Two separate but related questions are involved, then: whether to buy locally manufactured goods or to purchase American-made products; and, if ordering U.S. materials, whether to procure them through a private contractor or to specify GFM. Among the many advantages of buying local products are lower costs and faster procurement. Ordering native goods also tends to encourage local industry. In Okinawa, for example, the Division's policies have stimulated the production of cement and rebar for use on OED projects. The demand for locally manufactured precast concrete for Camp Hansen construction similarly helped develop a new industry for the Ryukyus. During the Division's first few years the only acceptable construction materials Korean industry could produce were aggregates, cement roof tile, and sand. By 1963, however, partly because POD had encouraged the use of local products in Corps projects, Korean enterprises were also furnishing cement block, corrugated asbestos siding and roofing, and precast concrete piles and poles. What Okinawa and Korea lacked the Division often sought in Japan, who had long been an industrialized nation and whose post-war economy had been redeveloped under direct U.S. supervision. Steel beams for the new hospital at Yongsan were among the recent items imported from Japan for use on a project in Korea.

The benefits of using locally made products were often offset by certain disadvantages. Many required items were simply not available locally, especially those needed for crash programs like 68-S. Poor quality always remained a possi-

bility; FED chose to order American plumbing fixtures for the Yongsan hospital because the Korean equivalents were not up to U.S. standards. The ability to supply local items has varied from contractor to contractor, too, so that the District has had to consider the supplier's reputation as well as the quality of his product. An additional problem occurs if goods are imported from Japan into Korea: only when the items are incorporated into a U.S. project can the Korean contractor receive a partial refund of his import tax. Many Korean firms are therefore reluctant to order supplies from Japan.

In spite of the many benefits deriving from the use of foreign manufactured products, then, these disadvantages of local procurement have often led the Division to order materials from the United States. This procedure has overcome many of the difficulties inherent in local manufacture: availability, high standards of quality, and familiarity with the product are among the advantages of procuring American goods. Yet this system is not without its drawbacks.

Slow shipments from the United States have occasionally held up POD's construction projects overseas, first of all. A dock strike on the eastern coast of the U.S. delayed FED's receipt of the 250 miles of pipe needed for the 68-S POL pipeline project; Far East District Engineer Colonel Franklin Day noted that almost every missed completion date on 68-S stemmed from a similar delay in the receipt of CONUS-procured items.<sup>6</sup> Another problem in ordering U.S. goods for construction in foreign countries involves import taxes and regulations. If the American material is to be furnished by a local contractor (rather than by a U.S. firm or as GFM), then certain financial questions

arise. In Korea, for example, the contractor is subject to rules in importing goods from the U.S. just as he is in ordering them from Japan. He must have established an irrevocable letter of credit with a bank in the United States; he must pay the full price of the equipment before it is shipped; he must deposit an additional 25% to 90% of the product's price with the Korean Bureau of Customs; and he must wait until the material is delivered to the job site to apply for a deposit refund. Converting Korean won into the American dollars required for payment has also hampered local contractors' efforts to import American goods.

Many of these import difficulties are resolved or eliminated by the use of GFM, whose advantages and disadvantages are discussed below. One problem still remaining, whether local contractors import American products or the District procures American GFM, involves International Balance of Payments (IBOP) limitations. Until around 1963, the U.S. Government permitted foreign contractors to obtain construction material either locally or from the U.S. as long as the product conformed to American specifications. This attitude began to shift in the early 1960's, then, when the U.S. administration initiated its "Buy American" policy aimed at stemming the flow of gold from the U.S. Contractors in foreign countries then were encouraged to purchase construction materials from the United States. In Okinawa, revised procedures included Ryukuan goods in those termed "American," since the Ryukyus were on a dollar economy. Even here, though, the new IBOP policy limited the use of Japanese or other far eastern products.

While POD has attempted to work within these guidelines, the Division has found

it necessary to request occasional exemptions because of the unusual nature of construction in the far east. In Korea, for example, FED's engineers had been gearing their designs to locally manufactured products; now they had to redesign many projects to conform with sizes and standards of American-made parts. The Far East District insisted that Korean concrete block construction cost so much less than American prefabricated buildings that using the American product would wipe out any cost reductions resulting from the favorable IBOP situation. Japanese-made products such as steel and lighting fixtures likewise were considerably cheaper than their American counterparts. FED also found that delays in procuring these items from the United States increased the overall construction costs enough to eliminate potential IBOP savings.

In 1966 FED included these and other examples in a series of studies designed to prove that effecting IBOP savings in Korea and Japan actually cost the Corps money. To save \$16 under IBOP policies, the studies noted, the District might spend up to \$244 in construction funds. FED was especially disturbed that this new "Buy American" program was instituted just when the District's encouragement of local industry was paying dividends in high quality production of foreign goods. Although OCE has granted some exceptions for certain work in the far east, in general the Division has adhered to policies relating to IBOP. Among the materials imported from the U.S. have been pieces of mechanical equipment for the cold storage plant at Pusan, the prefabricated buildings erected as USAHOMES in northern Japan, and the 250-mile pipe used in the 68-S pipeline. Administration rulings on IBOP matters as well as considerations of quality, cost, and

the development of local industry have helped shape POD's decisions as to where to procure construction supplies.

In cases where POD has chosen to use American goods, the Division must next consider whether to have private contractors order these materials or to request GFM. Here again, both the particular job and current Administration policies have entered into POD's decisions. Originally the Government favored the use of GFM for FED projects because of availability and quality. In the late 1950's, after all, Korean industries could not produce large quantities of construction materials, nor could the typical Korean firm afford the high import taxes on goods from Japan. These problems in procurement by local contractors made GFM extremely attractive. Furthermore, relying on GFM assured FED's designers of standard equipment that could be incorporated in any of the barracks, latrines, and mess halls being built throughout the country.

The use of GFM required storage of the Government-furnished supplies in the foreign land in which they were to be used. During FED's first year the District established three supply points in Korea located near major project areas to receive, store, and issue GFM. Fiscal year 1958 alone saw approximately 119,000 tons of Government-furnished materials enter these supply points, with 68,000 tons issued to construction sites.<sup>7</sup> Not only did Government-furnished equipment play an important part in shaping POD's overall procurement policies; the supply operations required to stock these tonnages also proved a challenge to POD's supply personnel.

For two or three years, then, POD relied heavily on GFM to fulfill its supply needs overseas. By 1960 the inevitable difficulties of stocking GFM began to surface, as

deterioration, pilferage, and overstocking took their economic toll. As a result, the start of the new decade witnessed a determined effort to reduce far east stocks of GFM, to arrange shipments of new GFM directly to the contractor, and to specify contractor-procured supplies whenever possible. Certain critical items have continued to be furnished by the Government, and the list of these materials has been expanded from time to time.

Changing administration views on both GFM and IBOP have thus had a direct influence on the Division's supply policies in foreign lands. In solving the many problems of procurement outside the U.S., POD has had to consider both sides of each of these important issues. On the question of buying local products versus purchasing American goods, the Division has tended to follow IBOP policies by requiring its contractors to procure items from the United States. Thus in July 1964 FED specified the use of American-made prefabricated buildings at Chinhae in order to stem the outflow of gold. Later that year, an American firm began to produce \$2.4 million worth of reinforced concrete pressure pipe for the RDWC in Okinawa. On Taiwan OED has established a special U.S. dollar bank account so that Chinese contractors may quote American dollars when ordering supplies from the U.S. Certain exceptions have been made, of course: during OED's 66-S construction, for example, the need to meet the Air Force's beneficial occupancy dates took precedence over IBOP policies and the District was permitted to use some non-American supplies. In general, however, OCE has encouraged the procurement of American goods.

Similarly, in most cases POD has tried to avoid using GFM and especially to avoid accumulating large GFM stocks. Between

1 January 1960 and 1 January 1961 the Division reduced its GFM stocks in OED and FED from a total \$3.7 million worth to only \$556,000 worth.<sup>8</sup> Here again, however, some exceptions have been made when it has appeared in the best interests of the Government to expedite a particular construction project or to stay within limited funds. Recent jobs in both Korea and Japan have required GFM. As noted earlier, the 68-S POL pipeline pipe was purchased from a Pittsburgh steel corporation; between November 1968 and July 1970 the Division bought \$8.4 million of GFM, or 11,023 line items, primarily for use in 68-S construction.<sup>9</sup> 66-S raised similar needs in Japan. Among the items furnished by the U.S. Government for that program were major pieces of equipment for the ship-to-shore project at Yokosuka and the radio frequency shielded enclosure for the Autodin facility at Camp Drake. Even before 66-S, in the fall of 1965 the urgency of replacing the operations building at Kamiseya called for approximately \$150,000 worth of Government furnished equipment. In spite of the desire to avoid GFM, then, for occasional "crash" projects the Division has ordered Government-furnished supplies. Restricting the use of GFM to these special cases has reduced the dangers of accumulating GFM stocks overseas.

Thus over the past decade the Pacific Ocean Division has tried to balance fluctuating Government policies with the needs of local construction. Were the Division's operations centered on the American mainland, many of these problems would not arise: "local" products would be "American" by nature; nearby industries would be capable of manufacturing suitable materials; and the International Balance of Payments would not enter into supply considerations. Even if

POD performed only in overseas areas belonging to the U.S., most of the factors discussed above—with the exception of shipping delays and their effect on GFM decisions—would not apply. The location of so many of the Division's projects in foreign countries has been a major factor in shaping POD policies of supply.

Since much of the material used in POD's far east construction has indeed come from the United States, the Pacific Ocean Division has relied heavily on the services of its Liaison Office in San Francisco. Established in 1957 as part of the new Division, the San Francisco Liaison Office has assisted POD with various mainland-related operations. The Liaison Office has worked closely with the San Francisco District (SFD) in fulfilling POD's supply needs, first of all. Procurement of GFM is one supply function in which the services of the Liaison Office and SFD have proved extremely valuable; in 1961, the Division estimated that 90% of its GFM procurement was handled by the San Francisco District through the Liaison Office. In a second area of supply the Liaison Office has been equally helpful, for its staff has aided POD's inexperienced foreign contractors in expediting the production and shipping of their contractor-furnished goods. The Liaison Office may ask OCE to secure production directives from the Business and Defense Services Administration of the Department of Commerce on critical long lead time items, and the Office may also arrange for the shipment of these items through military ports of exit. Thus POD has been able to meet its Districts' requirements for both GFM and contractor-procured supplies through its San Francisco Liaison Office.

The Liaison Office has assisted the Division not only in matters of supply but

also in the field of travel, for its staff has facilitated the movement of POD travelers through San Francisco. Thus HED as well as the two far east Districts has taken advantage of the Division's California contact. The Liaison Office has also helped the Division recruit mainland engineers for temporary duty with POD, for a third major concern of the Division's operations outside the United States, in addition to contracting and supply procedures, has been the area of personnel.

The difficulties of recruiting trained engineers, the employment of many local nationals, and POD's dependence on non-Corps hiring agencies have all challenged the Division's capabilities during the past ten years. In at least three ways POD's presence outside the United States has influenced many of its policies with regard to personnel. One of the most troublesome personnel problems the Division has had to face has been that of recruiting trained men, especially engineers, for duty in foreign lands. Certain regulations have made working in Okinawa rather unattractive to Federal employees on the mainland, for example. During most of the 1960's, instructions prohibited concurrent dependent travel from CONUS to Okinawa; only those holding GS-11 or higher ratings were eligible for Government quarters; a shortage of approved private rentals and the customary 68- to 72-week wait until housing became available further discouraged Department of the Army civilians (DAC's) from seeking work in Okinawa. Nor has the local labor market been a great source of employment for OED. Enticements from private Japanese and Ryukyuan firms have lured potential DAC workers in Okinawa, while the HICOM has restricted the importation of foreign labor to the Ryukyus, thus precluding the hiring of many Japanese or

Filipino engineers from abroad. As late as 1966 a CONUS contractor importing late-model equipment to Okinawa found no qualified local or third state nationals to operate the machines. While high educational standards have resulted in a better employment situation on Taiwan, recruiting personnel for work in Okinawa has proven one of OED's most difficult tasks.

The job has been no easier for FED in Korea. Similar conditions have applied to DAC's working there: the non-availability of Government or local economy family housing, the resulting policy of no dependent travel, and the remote locations of many construction areas have all made civilian assignments in Korea rather unattractive. Military personnel likewise have tried to avoid Korean duty. While short tours may have encouraged some military men to request duty with FED in Korea, one-year assignments have meant a high rate of turnover and a consequent lack of continuity in both personnel and programs.

Korea in particular has not been able to supply local talent to fill the DAC gap. Occupying Korea from 1905 to 1945, the Japanese filled most supervisory and technical positions with their own nationals, so that the end of World War II saw a great shortage of Korean managers and engineers. In addition, the 40-year occupation strained relations between the two nations, and the post-war Korean Government has been reluctant to allow Japanese engineers to work in Korea. The Far East District has been able to recruit local scientists for work in Japan, but in Korea, as in Okinawa, it has been primarily the lower grade clerical and technical positions that have been satisfactorily filled by native employees. This, and the dearth of DAC's willing to work in Korea, have focused the recruitment prob-

lem on the upper grades. Mechanical and electrical inspectors were especially scarce in the early 1960's, and the position of FED Construction Division Chief remained vacant from September 1964 to May 1965. As late as June 1970 the FED District Engineer, Colonel Day, noted that, "competent engineers...are particularly difficult to recruit."<sup>10</sup>

Various Administration policies have also affected POD's personnel affairs, just as Government attitudes on IBOP and GFM have shaped the Division's supply activity. In early 1963, for example, the Administration's efforts to stem the flow of gold called for the elimination of 12 positions of Construction Inspector in OED. This required terminating several foreign national (FN) employees, and the Okinawa District envisioned a difficult task ahead in recruiting eventual DAC replacements. A broader program effected in 1963 and 1964 to reduce the number of FN's in both OED and FED also created problems for those far east Districts. In fiscal year 1958 foreign nationals on both payrolls totaled 2,171; by 30 June 1963 the figure was 647; the new policy then set a limit of 590 FN's for the two Districts together. Since DAC's were not to be hired as replacements, this program sharply reduced the staffs of POD's far east offices.

In some cases the Districts then relied on local contractors' services to compensate for the loss of personnel, although this in turn increased the outflow of gold from the United States. Assigning remaining local nationals to 48-hour work weeks raised production but lowered morale. The late 1960's saw Government policies continue to affect the personnel situation in POD. A Department of Defense directive issued around 1966, for example, limited to five years the length of time U.S.

citizens could work in foreign lands. The resulting involuntary reassessments of OED and FED employees would deprive POD of both talent and continuity. 1968 instructions to reduce personnel and overseas travel costs by 25% likewise hurt POD; while a mainland Division might require only occasional trips abroad, over two thirds of POD's operations took place in foreign countries and depended on overseas travel by the Division and District staffs.

Even Kwajalein, not truly a "foreign" country, has presented POD with unusual circumstances which have made recruitment a challenge. DAC's have been understandably reluctant to work at the isolated atoll, where most "family housing" consists of trailers, where shipments to the post exchange are often late, and where the nearest large American community is 2,400 miles away in Hawaii. Income tax exemptions for civilians and cost-of-living allowances for the armed services have helped to make Kwajalein duty attractive, but many Americans still prefer Corps duty in CONUS.

To cope with these problems of recruiting for duty in foreign and non-CONUS areas, and to help fill the gaps left by enforced reductions in DAC staffing, the Pacific Ocean Division has pursued several concurrent courses. To encourage DAC's to seek foreign assignments, first of all, POD has urged higher pay and additional allowances. In 1966 the Department of the Army agreed to authorize payment of a separate maintenance allowance for employees in Kwajalein, since family housing was not available there. Not as successful was POD's plea for a post differential allowance for CCK Air Base; a Division personnel officer even visited the American Embassy in Taiwan to try to persuade the MAAG Commander to re-

store this benefit. The Division has also requested the extra pay and tax exemptions for military and civilian personnel working in the Marshall Islands and has sponsored slide shows to brief prospective Corps engineers on living conditions overseas.

Aware that shortages of qualified DAC's might continue in spite of the enticements of higher pay and allowances, POD has drawn on several other sources of labor for its far east Districts. Behind the 1959 move of FED's Engineering Division from Korea to Japan lay POD's desire to utilize relatively abundant Japanese engineering talents. Similarly, one reason for the frequent temporary duty assignments within POD has been the rapid turnover in OED and FED: the Division has often sent its staff members to fill in vacant District posts until replacements could be found. Also helpful has been the unusually large military enlisted complement furnished as a bulk allotment to POD and assigned from there to duty with the three Districts. These men have provided valuable engineering and inspection assistance on operational missions in the Pacific.

Another procedure rarely practiced in the Corps has helped to compensate for the shortage of upper-level personnel in FED. Before the Far East District became the Department of Defense construction agent in Japan in 1963, the Air Force had awarded a "Title II" contract for selected projects in northern Japan to the designers, the firm of Daniel, Mann, Johnson and Mendenhall. Since the transfer of these projects to the Corps of Engineers coincided with enforced cutbacks in foreign national employment, the Division decided to continue DMJM's Title II services. Relying on the contractors' personnel to supervise and inspect the projects' construction relieved an already overburden-

ed FED staff. Utilizing local nationals in OED and FED likewise has helped to fill the gap in the DAC staffs: the Division has encouraged promotions for FN's and has undertaken extensive training programs so that the Districts can take advantage of this source of talent.

While these measures have helped compensate for the shortages of American engineering talent in Korea, Japan, and Okinawa, they have introduced some new problems to POD. Chapter One referred to the difficulty of communicating between FED's Construction Division in Korea and its Engineering Division in Japan. Similarly, the same temporary duty assignments that have directed valuable personnel to vital construction sites have also strained District office space and raised costs because of transportation and per diem payments. Nor was the use of Title II services economical: to provide the equivalent of six U.S. employees and 28 Japanese nationals required a \$384,000 contract. Furthermore, Title II services provided only temporary relief; when the contract expired in 1966 the District had to increase the staff of its Japan Area Office by almost the number of DMJM employees who had managed those FED projects. Yet to some extent the steps taken by POD to make up for the shortage of DAC engineers have eliminated the unfavorable circumstances of staffing operations in foreign lands.

The employment of local nationals (LN's) has also resulted in unusual personnel procedures for POD. Most LN's have worked in the lower grades under DAC supervisors and alongside DAC engineers; this situation has raised considerations of morale as well as of different pay scales. Reductions in force (RIF's) have been particularly troublesome for POD because it employs so many foreign

nationals. As a result of the oriental tradition of loyalty between employee and employer and the importance of job security to Asian workers, POD's foreign nationals have been assured of separation allowances based on their length of service. This practice naturally has made RIF's of FN's especially costly for the Pacific Ocean Division. In Okinawa, furthermore, RIF's of local nationals must be coordinated with the All Okinawa Military Employees Union; delays as well as high severance payments often result.

In December 1966, 48 Filipino employees of the Okinawa Engineer District petitioned the District Engineer to request a resolution of their pay problems. They noted that they had received no pay increases from 1958 to 1966, whereas OED's Okinawan and American employees had; and that they had not been given Christmas bonuses, whereas the Filipinos who worked for the U.S. in the Philippines did receive such extra pay. Two years of negotiations among POD, USARPAC, and USARYIS representatives finally resulted in an agreement between the U.S. Department of Defense and the Philippine Government. The Filipinos would receive severance pay, a minimum wage similar to that of U.S. employees in the Philippines, and an extra half month's salary each December. In the meantime, in the fall of 1966 strikes by two Japanese labor unions kept 117 local nationals from reporting to work at FED (Rear) for a total loss of 446 man-hours. These two incidents highlight the unusual circumstances with which POD has had to deal because of its reliance on foreign national employment.

In order to make the best possible use of local national talent, both OED and FED have undertaken several training programs to educate and orient potential en-

gineers. In Okinawa, the joint sponsorship of OED and USCAR has enabled Ryukyuan engineer graduates to train with the District for three years; USCAR has paid the trainees' allowances, while OED has selected the graduates, conducted the program, and supervised the students' on-the-job training with the District's Design Branch. A six-week summer course has given younger students from the University of the Ryukyus a similar opportunity to train with OED. The Far East District meanwhile has provided advice and experience to military engineers of the Republic of Korea. A seven-month on-the-job training program for selected junior officers of the ROK Army has included a week's orientation and assignments to one of FED's Residencies for training in the field. Working shoulder-to-shoulder with their American counterparts, these Korean Army trainees have acquired practical engineering techniques which they have been able to apply in Korea. FED has also given ROK Air Force civil engineers six months of on-the-job training under the sponsorship of PACAF units in Korea. Both civilian and military engineers have received training with POD's far east Districts in programs designed to raise the construction potential in Okinawa and Korea.

In addition to training local engineers, all three Districts have hired young engineer graduates. Several junior engineers have begun work with HED upon graduation from the University of Hawaii, for example. FED has hired Korean civilians as engineers in Resident Offices, as field inspectors on specific jobs, and as technicians in the testing lab in Seoul. Personnel from FED (Rear) have visited universities near Tokyo to try to recruit engineering students, and OED has placed Ryukyuan graduates from schools in both Hawaii

and Japan. Employing young engineer graduates and training other native students have helped to relieve the shortage of DAC's in POD's Districts. Such programs have also contributed to the development of strong construction forces in these foreign lands.

At least one interesting aspect of POD's unusual personnel situation has been shared by the Honolulu District. All three Districts and the Division itself have been serviced by non-Corps civilian personnel offices. The U. S. Army, Hawaii (USARHAW) has handled personnel matters for POD and HED; in Okinawa the agent has been USARYIS; and in Taiwan the U.S. Air Force Support Squadron at Taipei has serviced TAO. The Eighth U.S. Army and USARJ have taken care of personnel affairs for FED and FED (Rear) respectively. Although the District Engineers do not have to go through the installation commanders in matters of civilian personnel, dealing with five separate personnel offices still has added to POD's difficulties in making temporary duty assignments or in arranging permanent changes of station within the Pacific Ocean Division.

Most of these features of POD's personnel procedures have developed as a result of the Division's working outside the United States. Attracting qualified DAC engineers to duty in foreign countries has proven a challenge because of Government restrictions on dependent travel outside the United States and on the length of DAC tours in foreign areas. The entire field of local national employment has likewise resulted from POD's presence in foreign countries; Divisions operating only in the United States need not concern themselves with extra separation pay for RIF's or with strikes of civilian employees. The unusual conditions of employment

outside the United States have distinguished the personnel policies of POD.

In the same way, POD's contracting procedures have been influenced by the Division's presence in foreign lands. The frequent use of negotiation, the need for close supervision and inspection, and certain features of POD construction have stemmed largely from the foreign character of the countries in which the Division has worked.

Likewise, POD's methods of supply have been shaped by the Division's work in foreign areas, as IBOP policies and the quality of local goods have entered into POD's decisions in matters of procurement. Although many of these features have applied only to the Division's far east Districts, and even there primarily to FED's work in Korea, almost all of POD's offices have felt the effects of the Division's various policies. The foreign nature of POD's operations has determined many of the Division's paths in the fields of contracting, supply, and personnel.

## Chapter V

1. Brigadier General E. I. Davis, Draft of a talk to be given to American Legion Post #13, 27 February 1958.
2. Cited in U.S. Army Engineer Division, Pacific Ocean, **Information Bulletin**, 18 September 1970.
3. U.S. Army Engineer Division, Pacific Ocean, "Mission, Organization and Functions," a briefing for Mr. Julian Hartt of the Los Angeles **Examiner**, 26 May 1958.
4. U.S. Army Engineer Division, Pacific Ocean, **Command Briefing** for Lieutenant General Frederick J. Clarke, 10 December 1969.
5. Letter from Colonel Franklin R. Day to Brigadier General Daniel A. Raymond, Director of Military Construction, Office of the Chief of Engineers, 30 June 1970.
6. *Ibid.*
7. U.S. Army Engineer District, Far East, **First Anniversary**, 1958.

8. **Command Inspection** of Pacific Ocean Division, February 1961.
9. U.S. Army Engineer Division, Pacific Ocean, "Major Achievements: Pacific Ocean Division: November 68 August 70," p. 3.
10. Letter from Colonel Franklin R. Day to Brigadier General Daniel A. Raymond, Director of Military Construction, Office of the Chief of Engineers, 30 June 1970.



The physical environment and the foreign cultures in which the Pacific Ocean Division operates have both shaped the course of POD's history. In a third way as well, the location of the Division's construction projects has been significant, for the areas in which POD supervises construction have been vital to American defense. As a result, all the military services and many U.S. Government agencies have stationed their forces in these countries. Construction agent for the United States Government in these designated Pacific locations, then, POD has been in charge of projects for an extremely broad range of military and civilian customers. The consequent variety of work for this diverse group of clients has distinguished the Pacific Ocean Division. The importance of these overseas lands to the American Government has also taught the Division to respond quickly to sudden incidents or shifts in U.S. policy. Because of America's vital interests in the Pacific Ocean, POD's work has been characterized by variety and flexibility.

The Division has encountered a variety of using agencies as well as a variety of unusual projects because of the American military presence abroad. POD has handled construction for the U.S. Army in all the Division's areas of operation, just as CONUS Divisions have built for U.S. Army commands on the mainland. In addition, however, the Pacific Ocean Division has served U.S. Army advisory groups such as PROVMAAG-K and MAAG, Taipei, agencies important to the American posture in the far east. Similarly, while POD's role as construction agent for the U.S. Air Force throughout the Pacific has found a parallel in the Air Force assign-

ments of mainland Divisions, POD's responsibilities for U.S. Navy construction in Okinawa, Taiwan, Korea, Japan, and the Marshall Islands have set her apart from other units of the Corps. Also unusual has been the Division's work for other U.S. military agencies such as SAFSCOM and its predecessors in the Marshall Islands. POD has been involved in many O&M-funded projects in the far east, too; while these jobs are normally handled by post engineers on the mainland, in the Pacific the Division has often been asked to help local U.S. commands construct base facilities.

In addition to building for the various U.S. military services in the Pacific, POD has supervised construction for civilian organizations of the United States Government. The Office of the Economic Coordinator (OEC), the Agency for International Development (AID), and the U.S. Information Agency (USIA) have received POD's services in the far east, while USCAR has been an important client in Okinawa. A recent FED project in Japan, for example, has involved supervising the construction of the U.S. pavilion at "EXPO 70" for USIA.

Servicing USCAR has led to the interesting question of whether its instrumentalities, such as REPC and RDWC, are captive customers of the Corps. Appropriating a \$1.8 million loan to pay for the 88-MW Kin Power Plant, the United States Congress stipulated that the Corps of Engineers be the construction agency. Although no Government funds have been involved in the construction of the new power plant at Machinato, the Department of Defense still controls USCAR's funds and can thereby guard the interests

of the Corps. Thus the relationship between POD and USCAR has been rather atypical of those between most Corps units and their clients. An attempt to avoid involving U.S. Government money in USCAR projects by having REPC fund some projects directly has resulted in another unusual circumstance, whereby the client, rather than the Engineer District, pays the construction contractor. Neither strictly Government agencies nor wholly private organizations, the various USCAR instrumentalities have introduced POD to interesting customer relationships.

Because the Division has operated in areas which host many U.S. Government agencies, its military and civilian clientele has been large and diverse. This clientele in turn has requested a great variety of construction projects new either to the Corps of Engineers or to POD. Several jobs for USCAR and many tasks related to water have distinguished the Pacific Ocean Division.

While CONUS Divisions do not usually build banks or power plants, for example, POD has constructed these for the Civil Administration of the Ryukyus. Between 1964 and 1968 OED supervised the construction in Naha of the Bank of the Ryukyus, a project paid for by a USCAR corporation. Even more unusual has been the District's involvement in electric power production for a semi-private corporation in Okinawa. CONUS Divisions have often harnessed rivers as potential sources of power, but they have generally left the actual production of power to private firms. In the Ryukyus, OED has not only managed the construction of power plants at Kin and Machinato but has also installed and maintained property accountability over a floating power plant. The U.S. Army in the Ryukyus has considered the generation of electric power

in Okinawa vital to its needs. Since 1963, REPC has been in charge of the production of that power. Because of these two circumstances, and especially because of the importance of Okinawa's electric power production for the United States, POD has been closely involved with power generation for REPC.

While USARYIS rather than RDWC has retained control of Okinawa's water facilities, OED has nevertheless acted as Contracting Officer for the water corporation. Thus POD's forces have managed many water-related projects throughout Okinawa. This work has resembled Corps water resources development activity in CONUS, but here these tasks have been funded and classified as "military" rather than as civil works. Also interesting has been the novelty of these projects to POD, for little in the Division's dredging, flood control, or beach erosion protection projects in Hawaii had prepared her staff for pipeline and dam construction in Okinawa. POD's unfamiliarity with this type of work encouraged requests for assistance from other Corps units more experienced in large-scale water resources development projects. Thus the New England Division (NED) published a Survey Report in 1966 on possible construction techniques for Fukuji Dam, while the Los Angeles District (LAD) designed the project itself in 1967. The planning for Fukuji Dam illustrated intra- as well as inter-Division flexibility and co-operation, too, for the Honolulu District contributed its civil works experience by assisting NED in its study for this OED project.

Through its work for RDWC, then, POD has been introduced to new activity in water resources development. Even some construction for REPC has involved water-related tasks, such as the installation of

POL lines in connection with the Kin Power Plant and the building of barge mooring facilities for the floating power plant, "Inductance." In addition, OED's work on Phase I of the Naha Civil Air Facility has included dredging and fill operations for land reclamation and the construction of a revetment to protect the filled area from wave-action erosion. For many of its "military" projects for USCAR, the Division has borrowed construction practices and techniques from its civil works experiences in Hawaii.

Nor has USCAR been the only source of the Division's water-related work. POD's construction in Kwajalein, for example, has called for dredging and fill operations designed to create needed land for new Nike facilities. The Division has also completed studies for AID which have involved water resources development. In 1964 POD reviewed a flood control study of measures to protect the area around Taipei, Taiwan, and in the same year Division engineers went over plans for the establishment of deep-draft harbors at two ports in Korea. FED's rehabilitation of the Inchon Tidal Basin likewise was funded through AID and related to harbor development.

Construction for the U.S. Navy also has introduced POD to many jobs which have resembled civil works. The deep-water berthing pier at Tengan and the major port facility at White Beach constituted important projects for the U.S. Navy in Okinawa. Among the water-related tasks managed for the Navy in Japan was the construction of 66-S mooring facilities at Koshiba and Hakozaki. This job, as well as a similar project for the U.S. Air Force at CCK, included the installation of the patented IMODCO buoy.

Thus as a result of its work for USCAR, SAFSCOM, AID, and the U.S. Navy, POD

has constructed a variety of interesting projects. Many of the Division's jobs for USCAR have been unusual in themselves: few other Corps of Engineers units have built banks or electric power plants. Other projects, such as water resources development for USCAR, dredging and fill in Kwajalein, and pier construction for the U.S. Navy, have resembled the civil works activities typical of the Corps of Engineers. Yet POD has carried out these "civil works" projects in areas in which it has had no civil works responsibilities; its water-related tasks in the far east have been performed for "military" customers. The diversity of the Division's clientele has thus led to diversity in project construction. Because these regions of the Pacific have been so important to American defense, a wide variety of military and civilian agencies have relied on POD for their construction needs.

Flexibility as well as variety has characterized the work of the Pacific Ocean Division because of America's vital interests in that region. Division Engineer General Podufaly described POD's unique situation in February 1968:

While all U.S. Army Corps of Engineers divisions and most districts have the mission to support our military establishment, only POD is in an active theater of military operations. Many of our projects, including some in Hawaii, directly support Vietnam and help to strengthen our present and future military position in Korea. In addition, we have an unusual role in the development of the U.S. ABM system...a key to our future defense posture.<sup>1</sup>

Thus the areas under POD's jurisdiction have held great importance for American defense. As a result, unexpected international incidents or sudden shifts of Ad-

ministration policy have often required quick response by the Division. The construction of specific projects, the development of base and camp facilities, and the Division's personnel policies have all been influenced by fluctuating circumstances in the Pacific.



The deep-water berthing pier under construction at Tengan, Okinawa, in September 1964.

Just a few years after POD's establishment, for example, the bombing of Quemoy and Matsu by mainland China created an immediate need for modern anti-aircraft facilities on northern Taiwan. The urgency of this Nike defense project meant that only 35 days were allowed for Phase I design and that construction and design would have to develop concurrently. Soon after, another example of the Division's ability to respond to unanticipated political events was occasioned by incidents in Japan. Disturbances there over the renewal of the treaty with America led the U.S. Government to suggest delaying the construction of certain operational facilities in Okinawa, where Japan maintained residual sovereignty. The 1960 demonstrations also influenced POD's deliberations on merging its two far east Districts by raising some doubts as to the desirability of establishing a single District in Japan. Political developments during POD's first few years

thus affected the Division's activities in the far east.

General policy changes in Washington as well as specific incidents in Asia have called for great flexibility on the part of POD. The 1963 designation of FED as construction agency for all the military services in the Pacific inspired a dramatic shift in the emphasis of the District's work. The sudden jump in FED's workload from \$11.9 million in fiscal year 1963 to over \$19.6 million in fiscal year 1964, the District's abrupt introduction to Air Force and Navy projects in Japan, and the use of Title II services all stemmed from this DOD decision and all required quick adjustments by POD.

During the same period, changes in America's Nike research and development program occasioned similar flexibility in the Marshall Islands. The original Nike program had demanded sudden adjustments by POD forces; improvements designed during construction called for over 26,000 drawing changes between mid-1959 and the spring of 1962. The 1962 Department of Defense decision not to proceed with actual Nike-Zeus construction then led to a lull in Kwajalein activity, to a drop in HED's workload from \$70.1 million in fiscal year 1961 to \$11.8 million in fiscal year 1963, and to the consequent POD/HED mergers described in Part One above. Administrative modifications were not the only adjustments called for by fluctuations in the Nike program. By early 1963 DOD had announced its plans for Nike-X, and by the end of that year HED had contracted for new work at Kwajalein and Meck. Included in a subsequent contract was the conversion of several Nike-Zeus facilities for use with Nike-X. The Defense Center Control Building (DCCB), for instance, was redesigned in 1967 to house a combined aperture multifunction

array radar (CAMAR), while even more recent DOD decisions have resulted in the cancellation of work on CAMAR facilities. Fluctuating DOD decisions on this research and development program have contributed to modifications in actual design and construction as well as in office administration.

Pacific Ocean incidents in the late 1950's, POD's additional DOD assignments beginning in 1963, and variations in the Nike testing program in the mid-1960's, then, have demanded quick responses by POD. The rest of the decade has witnessed equally rapid reactions to changes in the international scene. American efforts in Viet Nam around 1965 called for the heavy construction workload funded as the fiscal year 1966 Supplemental Military Construction Program, for example. The first POD project to spring from this dramatic buildup in Southeast Asia involved the conversion of Army buildings in central Japan into hospitals for wounded Americans. As noted in Chapter Two of Part One, rapid design and construction characterized this sudden assignment. The Division had to maintain its flexibility during the hospital project's progress, too. Authority to begin designing facilities at Drake was received after construction at Oji had begun, while two weeks after that USARPAC approved yet another phase of the project at Tokorozawa. Halfway through the design of the facilities for Camp Drake, USARJ requested that three additional buildings at that site be remodeled, and the designers had to modify their plans once more. In the summer of 1966 USARPAC downgraded the hospital project and cancelled construction of the already designed facilities at Tokorozawa. Thus fluctuating conditions in Southeast Asia kept the Division on its toes during the entire hospital

conversion program in Japan.

The situation in Southeast Asia in 1965-66 also resulted in quick decisions and unusual procedures in Okinawa and Taiwan. Many of OED's staff had to work overtime to handle the sudden increase in workload from \$39.7 million in fiscal year 1966 to over \$85.3 million in fiscal year 1967. One result of the urgent nature of 66-S construction in OED was the use of cost-plus-fixed-fee contracts for CCK and Kadena, since under these contracts the District could initiate equipment procurement during the project's design. The rapid buildup of U.S. forces in Viet Nam also affected the design of the 66-S storage facilities at Machinato; the engineers had to reject precast, prestressed framing systems in favor of precast concrete wall systems partly because of the need for speed. In addition, the sudden influx of U.S. military forces in Okinawa as a result of increased activity in Southeast Asia raised the island's power consumption and thus made the construction of the new Machinato Power Plant and the installation of the "Inductance" especially urgent. Quick responses in reaction to activity in Southeast Asia characterized the operations of both FED and OED in the late 1960's.

Even more vivid examples of shifting workloads and consequent adjustments by POD can be found between 1968 and 1970. The infiltration of the DMZ and the seizure of the *Pueblo* called for an immediate increase in American military strength in Korea and consequently for rapid construction of both airfield improvements and new troop housing. As with 66-S projects in Japan and Okinawa, speed was essential: the District completed an evaluation of 26 Korean airfields within three months, using an estimated 8,000 manhours of work and 30,000 sheets of paper while



Paving at Kunsan Air Base, Korea, in late 1968.

traveling 12,000 vehicle miles.<sup>2</sup> Improvements to the taxiway overlays at Kunsan and Osan required "phasing," meanwhile, in order to keep at least a portion of the fields open during construction. Workers closed one area and moved all aircraft to another section of the field, paved the first portion, and repeated the procedure two or three times until all paving was complete. The tense situation in Korea at that time required the continued availability of these airfields and thus influenced FED's construction procedures.

The "crash" nature of the Tab Vee and 68-S programs in Korea led to other un-

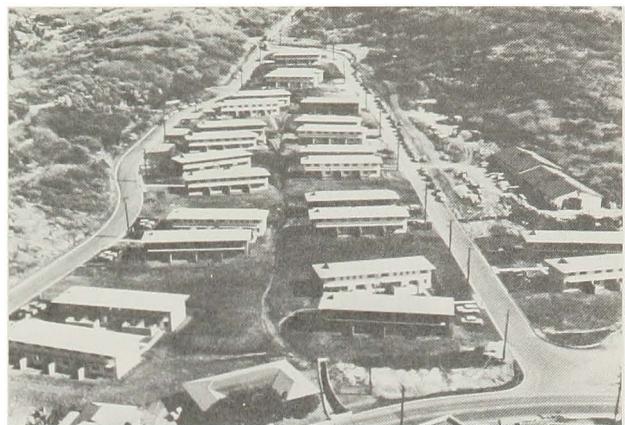
usual circumstances as well. The District was given authority to advertise the Tab Vee projects at Kunsan and Osan before the receipt of funds; aware of the projects' urgency, FED rushed through the design phase and advertised for bids, only to find at that point that the Department of Defense had not yet approved the O&M portion of the required funds. As a result, the bid opening was postponed for several weeks. Designing new facilities for 68-S proved especially difficult, for the using agency might change the scope or location of a project after the award of the construction contract, according to current

developments in the far east. Similarly, the urgency of all the 68-S projects demanded that the design be done quickly, yet new conditions not at first apparent often required subsequent redesign with resulting overruns in cost.

The logistics of 68-S construction also posed problems: in remote construction sites where neither housing nor office space was available, both construction crews and District forces operated out of hurriedly erected tents. Among the FED elements affected by the sudden increase in activity in 1968 were the Construction Division, which moved back to Korea, and the Engineering Division, whose Chief's office was also relocated near Seoul. These changes, discussed in Part One, were accompanied by the establishment of two new Area Offices and eight new Residences within FED. America's determination to increase its military strength in Korea in 1968 thus inspired rapid adjustments in design, construction and administration.

Incidents in the Taiwan Straits in 1958 and in Japan in 1960, Department of Defense decisions in 1963, fluctuating conditions in Southeast Asia around 1965, and provocations by North Korea in 1968 have all tested the flexibility of the Pacific Ocean Division. Less dramatic but still important has been POD's reaction to gradual changes in troop deployment in the areas under its construction jurisdiction. The fluctuating levels of military strength in the Pacific have shaped much of the Division's work in developing camps and bases.

For HED, for example, the end of the Korean War in 1954 meant the return to Hawaii of thousands of American soldiers. As a result, HED's military construction in Hawaii in the late 1950's focused on housing and related facilities at Schofield



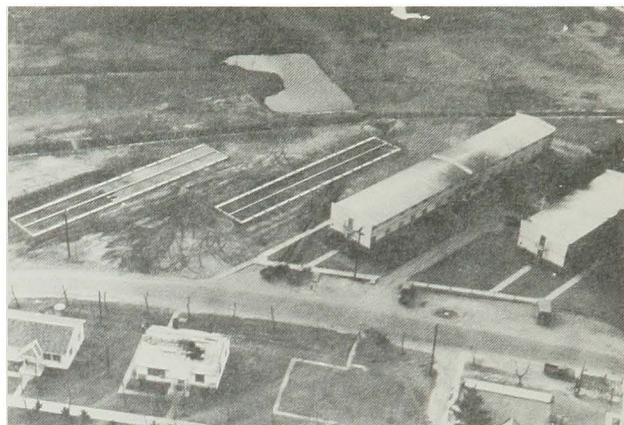
Capehart housing project constructed at Fort Shafter, Hawaii, January 1959.

Barracks, Fort Shafter, and Hickam Air Force Base. The 1960's saw many troops leave Hawaii for the Western Pacific, then, so that fewer new military housing units were built on Oahu during that decade.

The Korean War convinced the American Government to station permanent forces in the Ryukyus as well as to strengthen their complements in Hawaii. Thus OED, like HED, directed much of its attention in the late 1950's to base and camp development. The facilities constructed at Camp Schwab, Camp Courtney, and Camp Hansen between 1958 and 1960 represented the District's response to the increased needs of the services in Okinawa. Whereas many military units left Hawaii during the 1960's, Okinawa retained a large complement of American forces to meet potential threats in the Pacific. Thus OED's development of military facilities continued well into the 1960's. The rest of the decade saw the construction of extensive housing projects at Naha, Futema, Kadena, and Machinato, as well as the erection of chapels, theaters, and schools. The importance of the Ryukyus as an American base in the Pacific led to OED's steady development of camps and bases on Okinawa.

The situation in Korea in the late 1950's resembled that of Okinawa, for in neither country had a large American military force been stationed prior to the Korean War. Thus while HED concentrated on troop housing at already established posts in Hawaii, OED and FED built entire bases in Okinawa and Korea. Work at Camp Carroll and the Spring Valley Ordnance Depot began in 1959; the development of small housing areas at Chinhae and Seoul took place around 1960. Since the United States intended to rely on additional military units stationed elsewhere in the Pacific in case of an emergency in Korea, however, the rest of the decade saw rather scattered base development on the peninsula, and the housing facilities demanded by 68-S were designed as temporary rather than permanent structures. FED's activity in Japan meanwhile focused on new housing at old posts, since Japan, like Hawaii, had previously played host to large American forces. The expansion of base facilities at Chitose around 1960 reflected the Pacific-wide increase in American strength after the Korean War. Continued reliance on U.S. bases in Japan during the 1960's called for the construction of miscellaneous housing at Tachikawa, Iwakuni, and Chitose and for the installation of USAHOMES in northern Japan.

In Hawaii, Okinawa, Korea, and Japan, then, the continuing requirements of American military strength have influenced the Division's steady development of housing and other base facilities. Likewise, specific events in international affairs have resulted in actual changes in POD's design, construction, and administration. These international incidents and varying U.S. troop strengths overseas have both stemmed from the high stakes America holds in the areas under POD's jurisdiction. Both factors in turn have in-



Temporary officers' dormitories erected at Kunsan Air Base, Korea, in 1968.

fluenced many personnel policies of the Pacific Ocean Division.

Throughout this ten year period, the Districts' rapidly fluctuating workloads have called for many adjustments in Division-wide staffing. The demands of construction for the KQ 502 airfield on Taiwan, for example, led OED to locate its Taiwan Area Office on the job site itself. The \$25 million project was considerably larger than the tasks normally handled by most Area Offices and thus required extra efforts by the TAO staff. A few years later HED and the Division felt the effects of a shrinking workload, as the mergers described above called for POD's personnel officer to rewrite approximately 120 job descriptions. These 1962 consolidations of Division and District offices also resulted in some interesting personnel figures. Since most of HED's service and administrative functions would now be furnished by POD, the ratio of GS-11 and above positions to the total position count rose sharply for the District and fell almost as dramatically for the Division. POD's work on Kwajalein required similar adjustments less than a year later. As the bulk of Nike-Zeus construction neared completion in 1962, the Division made plans to remove all but four staff members from the Atoll.

In January 1963, however, the Army Missile Command office in Kwajalein requested that the HED Residency there be staffed with eight members pending the development of a then-classified project. By the end of 1963, then, that Residency had been enlarged to a Project Office and by 1968 to an Area Office with almost four dozen civilian employees. The uncertainties of Nike construction made personnel needs in Kwajalein difficult to predict.

Nor was the timing of the 66-S program a boon to the Division's personnel office. Even under relatively stable conditions, staffing for "crash" construction projects in Okinawa and Taiwan would involve recruiting for remote locations, housing temporary employees, and transporting new personnel. These problems were compounded in 1966, for the jobs at CCK and Kadena were not the only new projects generated by the current activity in Viet Nam, and the Corps of Engineers was not the only Federal agency recruiting at that time in that region of the world. The same situation in Southeast Asia which had generated this new work for POD has also provided a roster of other openings which would compete with POD for Pacific personnel. The tapering off of the 66-S program brought additional personnel problems, as the declining workload required rapid shrinkage of the staff. This was especially true in Taiwan, where the complement which stood at 122 at the peak of CCK construction had dwindled to 64 a year later.

The Division had no sooner returned to a normal pace and staff size after the boom of 66-S when the incidents in Korea suddenly demanded the quick responses discussed above. Personnel plans as well as design, construction, and administration were affected by this new crisis in the Pacific. The additional, unexpected con-

struction projects created a need for a greatly enlarged staff, first of all, so that the personnel requirements of the Far East District alone jumped almost 60%, from 557 in February 1967 to 835 in December 1968. The winding down of the program in late 1969 then brought RIF's to FED, just as the end of 66-S had called for reduced staffs in Okinawa and Taiwan. Personnel planning for 68-S was especially frustrating because of initial uncertainties regarding funding. Thus HED in 1962 and 1963, OED in 1966 and 1967, and FED in 1968 and 1969 all found their personnel policies affected by variations in the construction needs of the Pacific.

The personnel problems discussed in the previous chapter stemmed primarily from POD's presence in foreign lands; most of those unusual conditions were fairly constant, characterizing the Division's entire decade, and the measures taken by POD to cope with those conditions were likewise of a broad policy nature. In contrast, the personnel problems arising from unexpected construction assignments and from the consequent need for flexibility have occurred irregularly, in direct response to events or policies in the Pacific. Thus they have called for temporary, remedial measures.

One practice followed occasionally by the Division has involved the transfer of design projects from one of its three Districts to another. In 1961, for example, when an unexpected increase in FED's workload strained its Engineering Division's staff, POD assigned seven projects from FED to HED so the Honolulu District might accomplish their design. In the same way, the Division gave the design of some 68-S work to OED, partly to relieve the sudden pressures on the Far East District. POD has also encouraged its employees to work overtime during "crash"

programs. FED's Engineering Division thereby doubled its normal output in designing projects for 66-S. Converting positions to local national incumbency has occasionally released DAC's for work on urgent projects. And the Division has often sought help from OCE in recruiting permanent change of station (PCS) employees, especially for the 66-S and 68-S construction programs. In these ways POD has demonstrated its flexibility in adjusting to fluctuating personnel needs.

The Division's most common method of meeting sudden personnel demands has involved temporary duty (TDY) assignments within the Division itself as well as from other Corps of Engineers units. As early as late 1956, prospective POD members worked with the Eighth U.S. Army Engineer's Office in arranging TDY personnel transfers from OED to Korea to assist in establishing the Engineering, Construction, Supply, and Administrative Divisions of the new Far East District. In early 1958, then, the Division assigned three engineers from HED to temporary survey work with FED in Korea. The combined pressures of Nike missile construction and the KQ 502 airfield project called for additional construction personnel in Taiwan in 1958; the Division responded by transferring inspectors from Okinawa to Taiwan and by shifting inspector personnel within the Taiwan Area Office. POD also backed OED's designers with help from its own Engineering Division. Outside the areas of design and construction, too, the Division has often sent its staff on TDY to the three Districts; during 1960 and 1961 POD's counsel was making at least two visits annually to each of the Districts and was providing additional assistance on difficult cases.

Later in the decade, TDY assignments within the Far East District proved useful

in coping with a sudden increase in workload. When a shipment of USAHOMES arrived in northern Japan in the fall of 1965, FED sent three of its inspectors from Korea to help with the installation of the prefabricated buildings. The crash programs of 66-S and 68-S also called for the use of TDY assignments within POD. In 1966 the Division ordered many of its own design and construction people to work on CCK, for instance. While awaiting new personnel from CONUS for the same program, the Division furnished interim employees on TDY. The design and construction needs of 68-S also called for a heavy stream of TDY personnel to Korea. 30 or 40 extra staff members from POD worked on the program during most of 1968 and 1969, with an equal number of temporary employees recruited from CONUS. By December 1968 the Division had begun to change the key positions in FED's Engineering Division from TDY to PCS in order to formalize the continuity already being furnished by these extended but "temporary" tours. TDY assignments from the Division to the Honolulu District have usually meant only minor paperwork and a move down one or two flights of stairs. In temporarily relocating Division staff with the two far east Districts, however, POD has had to consider flight scheduling, temporary lodging, and travel and per diem expenses.

In addition to redistributing its own personnel throughout the Division to cope with suddenly heavy workloads, POD has often arranged for CONUS Corps members to assist its three Districts. Occasionally certain aspects of a POD project have been assigned to Corps units familiar with the particular project. Thus in 1958 personnel from the North Pacific Division performed preliminary studies for the Inchon Tidal Basin rehabilitation,

and the Seattle District was then utilized for the project's design. In 1964 engineers from the Portland and Los Angeles Districts performed the final review of POD's flood control study for the Taipei area. In the mid-1960's, again because of their familiarity with large water resources development projects, the New England Division completed the extensive study of the Okinawan water system and the Los Angeles District then designed the new dam at Fukuji. Thus POD has utilized the experience of other units in the Corps.

The Division has also requested that personnel from CONUS units be assigned on TDY to POD's Districts. Especially grateful for this assistance were OED and FED, whose Supplemental Programs in 1966 and 1968 strained the capacities of their existing staffs. The San Francisco Liaison Office assisted POD in this CONUS recruiting. At the start of 66-S construction the Division had attempted to fill a number of PCS positions in Taiwan with CONUS personnel. By September 1966, recognizing the urgency of the airfield project and the difficulty of finding permanent DAC employees, POD ordered most of these PCS requests changed to TDY so the positions could be filled more quickly. Two years later 68-S construction in Korea saw the temporary assignment of over 60 personnel from CONUS units as far away as the New England and Ohio River Divisions and the Cape Canaveral and Savannah Districts. In taking advantage of the experience of other Corps members, POD exhibited typical Corps flexibility. An article in *The Military Engineer* of September-October 1960 praising FED's establishment in Korea noted in particular the Corps' ability to obtain experienced men from its other Districts and Divisions and cited this ability as one of FED's greatest potential

assets. The Division has utilized TDY assignments both to compensate for a constant shortage of permanent DAC employees and to fill in temporary gaps in its various staffs.

These gaps have arisen primarily because of the fluctuating workloads of POD's three Districts, and these fluctuations have stemmed in turn from changes in the political scene in the far east. Because the areas in which POD operates are so important to American foreign policy, the challenge of construction in that region has brought both variety and flexibility to POD. These lands have hosted a diversified clientele of civilian agencies as well as all the U.S. armed services. The many unusual projects requested by these customers have ranged from the repair of the Inchon Tidal Basin in Korea to the production of electric power in Okinawa. International incidents such as the bombing of the Quemoy and Matsu or the seizure of the *Pueblo*, and broad policies determined by the Department of Defense have both called for great flexibility on the part of POD. Sudden assignments like the conversion of barracks to hospitals or the construction of a 250-mile pipeline have been prompted by far east affairs, while increased workloads in Kwajalein and Japan around 1963 likewise stemmed from continuing American interest in those regions. The fluctuating workloads created by all these factors have affected POD's personnel plans and have called for the frequent use of TDY assignments. Constructing for the U.S. Government in areas of vital interest to American policy has brought challenge and excitement to POD's first ten years.

## Chapter VI

1. U.S. Army Engineer Division, Pacific Ocean, **Information Bulletin**, 15 February 1968.
2. U.S. Army Engineer District, Far East, **Draft History**, 15 March 1970.

The preceding three chapters have discussed the effects of geography, construction in foreign lands, and operations in strategic areas on the history of the Pacific Ocean Division. One area strongly influenced by all three of these factors has been POD's real estate activity. Whereas CONUS Divisions usually handle real estate for the Army and Air Force, POD has serviced other military branches and USCAR as well; whereas the real estate activity on the mainland normally involves fee acquisition, POD has dealt primarily in leaseholdings. The Division's real estate responsibilities have also varied from District to District. Procedures in Hawaii are similar to those in CONUS, while work in Kwajalein has involved the U.S. Navy; in Okinawa the U.S. Government rents land for a fee, while in Korea the U.S. pays no rent. Even within each District, real estate activities have varied: Hawaii's CONUS-like dealings are considerably simpler than the transactions with the Trust Territory of the Pacific Islands (TTPI) and the U.S. Navy for land use in Kwajalein; OED has handled real estate matters in the Ryukyus but not in Taiwan; and FED has had real estate responsibilities in Korea but none in Japan. Largely as a result of the environment, of the foreign cultures of the Pacific, and of the importance of all these lands to U.S. policy, both diversity and challenge have characterized real estate procedures in POD.

Of the four regions in which POD has managed real estate for the U.S. Government, two have fallen under the jurisdiction of HED. Until 1962 the Honolulu District handled real estate matters for POD in both Hawaii and the Marshall Islands.

Among the District offices merged with Division units in that year was HED's Real Estate Division. Since 1 July 1962, then, the Division itself has had operational responsibility for real estate activities in Hawaii and Kwajalein. POD's real estate duties in Hawaii have included the acquisition and disposal of land for the U.S. Army and Air Force. Many of Hawaii's real property cases have arisen because of the three factors noted above: the islands' geography differs from the CONUS norm; in 1959 Hawaii became the 50th State; and during the entire decade the chain has hosted important American military bases.

The island nature of Hawaii, first of all, has limited her geographic expansion and hence made land especially valuable. Because even the early settlers realized the importance of land in an island chain such as this, Hawaii's property has been owned by a relatively few landholders. This tight private control over Hawaii's property and the geographic limits of the islands have led both the State and private interests to resist Federal attempts to acquire land in Hawaii. As a result, many of POD's real estate acquisitions in the islands have involved leaseholds rather than fee simple transactions. In 1964, for example, the Division arranged to lease from the State approximately 29,000 acres for use as military training sites. A safety area adjoining Aliamanu Military Reservation was leased two years later for over \$33,000 per annum and then was returned in 1967. 1966 also saw the lease of almost 19,000 acres at Kawaihoa for approximately \$17,500 per year. These transactions were typical of the leaseholds acquired in Hawaii by the Pacific Ocean Division.

While Hawaii's territorial status from 1898 to 1959 may have had little actual effect on POD's real estate responsibilities, the advent of statehood in August of 1959 did contribute to an increase in real estate activity in the islands. The Statehood Act permitted the Federal Government to take fee title unilaterally to certain areas owned by the new State but occupied by the military under leases or licenses granted prior to statehood. The State successfully countered most Federal justifications for fee acquisition, however, and the military has continued to hold most of its property via long-term leases rather than in fee. Land disposal as well as acquisition increased as a result of statehood, as the Federal Government decided to dispose of excess property only partially utilized by the military but desired by the new State. Also of interest around this time was the passage of the Sand Island Act, providing that lands previously acquired from the State by the military must revert to the State when they became excess to U.S. requirements. POD's Real Estate Division participated in almost all the real estate conferences and negotiations connected with statehood and prepared the real estate documents needed to complete the negotiated transactions. Understandably, then, statehood for Hawaii meant a greatly increased workload for POD.

The island nature of Hawaii has thus made its land especially valuable and has resulted in a large percentage of holdings by lease. The large number of transactions required by the shift from territorial status to statehood in 1959 also affected POD's real estate activity. Likewise, the importance of Hawaii to the American Army and Air Force has influenced certain aspects of POD's real estate program between 1957 and 1967.

By the end of the decade, for instance, the Real Estate Division administered a total of 225 outgrants involving Army, Air Force, and civil works reservations. This program has provided that because the military services control so much valuable property on Oahu the U.S. Government may grant the non-military use of some of these lands. The entrance of the Air Force into the local market for leased family housing in 1967 has introduced POD to another type of real estate activity. By 1970 the Division had leased approximately 200 apartments at an annual rental of \$419,000 for use as Air Force housing. The housing shortage in Hawaii and the importance of staffing the islands' Air Force bases has led to this interesting real estate project.

Other transactions with and for the military have kept the Division's real estate office busy throughout the entire decade. In 1959 and 1960 the Government conveyed to the State approximately 171 acres at Hickam Air Force Base in exchange for 157 acres of State land; in 1964 the services acquired 87,336 acres from the State for use as training sites. The United States conveyed the 605-acre Sand Island Military Reservation to Hawaii in 1959 and 1964, 77 acres of Bellows Field in 1966, and a total of 105 acres of Schofield Barracks Military Reservation between 1960 and 1965. Thus most of POD's real estate activity in Hawaii has involved the changing requirements of the various military services. Their presence in Hawaii, of course, reflects the islands' importance to Uncle Sam. This factor, the scarcity of land in the island chain, and the advent of statehood in 1959 have all shaped the Division's real estate responsibilities in Hawaii.

In Kwajalein as well as in Hawaii, HED and POD have experienced interesting cir-

cumstances in their real estate work. Real estate procedures in the Marshall Islands have differed from those customary either in CONUS or in Hawaii. Since the establishment of Kwajalein as an Army command on 1 July 1964, POD's Real Estate Division has acted as agent for the U.S. Government in almost all United States real estate transactions in the Marshall Islands. The Navy has maintained responsibility for meeting U.S. real estate requirements there, however; the Corps of Engineers has had no operational real estate responsibilities in the Marshall Islands. Under the procedures followed for real estate needs; POD's Real Estate Division requests acquisition action from the U.S. Navy in Pearl Harbor; and the Navy in turn requests acquisition action from the U.S. Navy in Pearl Harbor; and the Navy in turn asks the Government of TTPI to acquire the land from private owners. These owners are reimbursed with one-time payments from U.S. Government funds. The Government of TTPI turns the property over to the Navy under a use and occupancy agreement, and the Navy then allows the Army to use the land so acquired.

Geography, foreign culture, and the significance of the Marshall Islands to America's anti-missile defenses have all affected POD's real estate activity in Kwajalein. The Marshallese value their land even more highly than do the citizens of Hawaii, for in the Trust Territory existence depends almost entirely on agriculture. In addition, Marshallese tradition appraises a man in terms of his property, so that land is extremely important to the inhabitants of the Trust Territory. Because of the Marshallese reluctance to sell farmland, then, real property in TTPI has been acquired by leasehold rather than in fee.

The importance of the islands to America's defense system has influenced the U.S. Government's real estate dealings in Kwajalein and has been partly responsible for the rate changes negotiated during the past ten years. Some land has been leased for 99 years at \$500 per acre for the full lease term; other 99-year leases have been set at \$1,000; while other \$500/term leases have run for only 25 years. These variations reveal the U.S. Government's willingness to negotiate with TTPI in order to continue using the Marshallese lands so vital to America's anti-missile research. These same negotiated leases also reflect the economic and traditional importance of land to the Marshallese. The geographic limits of Kwajalein, the cultural traditions of the native population, and the importance of the area to U.S. policy have all contributed to POD's real property activity in the Marshall Islands.

The situation in Okinawa resembles that in Kwajalein in that geography and tradition have made land especially important to the inhabitants of the chain. Thus OED's real estate program in the Ryukyus has offered familiar challenges. The District's real estate responsibilities have differed somewhat from those of HED, however, since the Okinawa District Engineer serves as the agent of the High Commissioner in acquiring and disposing of all real estate controlled by U.S. forces in Okinawa. The District Engineer is also executive agent to the representative of the Commander in Chief, Pacific, and as such effects inter-service coordination in real estate affairs in Okinawa. In addition, the District handles real estate matters for the four military services and five Federal agencies which hold land in the Ryukyuan Islands. In putting into effect the real estate cases introduced by all these agencies, OED has encountered a

variety of interesting real estate work in Okinawa.

As in Kwajalein, limited space and cultural tradition have combined to make land in the Ryukyus highly valued. In the province of Okinawa, for example, population density as of October 1965 stood at almost 1,500 persons per square mile. Landholdings in Okinawa are small, averaging about one acre per owner. Geography has also contributed to the population's dependence on agriculture; farming constitutes the Ryukyuans' main occupation, and since the entire family helps till the soil, agriculture provides the focus of family life. Thus the 80,000 arable acres on Okinawa are in great demand. Tradition plays its part, too, as ownership of land normally passes on to the first son of the family, so that the head of the house considers his property a heritage which should not be sold. Both Okinawa's geography and its foreign culture have contributed to the Ryukyuans' reluctance to sell their land.

As a result, all OED's real estate acquisitions from private owners in Okinawa have been lease hold interests. In this way real estate procedures in the Ryukyus differ from those in CONUS, where to build permanent installations on non-Government land the property must first be acquired in fee. Real estate transactions in Okinawa may involve either of two types of leasehold interest. An indefinite leasehold gives the U.S. the full and exclusive use and possession of the property for an unspecified period of time and allows the U.S. to revoke the agreement by filing notice 60 days in advance. The owners may receive a long- term prepaid rental for from six to ten years; after that period, the owners collect an annual rental each year in advance. The provisions of the five-year leasehold are similar to those of the

indefinite leasehold except that here the term is for only five years, and in this case the U.S. has no obligation to make a long-term prepaid rental payment. Deeply involved in both types of real estate acquisitions has been the Government of the Ryukyu Islands (GRI). Under the terms of a GRI-OED service contract signed 27 January 1959, GRI determines the ownership of the land and improvements; purchases these improvements for the U.S.; executes the individual land leases with the owners; makes the rental payments; and transfers the interest obtained through these basic leases to the U.S. via a master lease. The rental rates were agreed on during the joint Ryukyuan-American Land Conferences held in 1958 and have been revised every five years since then. For fiscal year 1970, the U.S. Government paid approximately \$10.4 million in land rentals in Okinawa.<sup>1</sup>

The scarcity of land in the Ryukyus and the people's traditional dependence on agriculture, then, have meant that OED has dealt primarily in lease acquisitions. In addition, the importance of Okinawa to U.S. foreign policy and the recent history of the islands have led to another type of real estate holdings in the Ryukyus. In effect, the U.S. Government has the rent-free use of certain property of the Governments of Japan and of the Okinawa Prefecture, which were not divested of their land after World War II. Custody of this property is held by the Office of the Ryukyuan Property Custodian of USCAR, and the land is allocated to OED as required for U.S. forces' use. As of 31 December 1969, U.S. services and agencies were leasing approximately 51,191 acres of privately owned land in over 137,000 tracts and another 24,201 acres of land owned by the Governments of Japan and of the Okinawa Prefecture.<sup>2</sup> The U.S. has

also been able to use some privately owned land on a temporary basis for training purposes. Under this plan the municipality concerned grants a permit to the United States, who then pays a compensation based on the number of days of actual use in a yearly period. The mayor of the municipality receives the payment and distributes it to the private owners. Long-term agreements with private owners, free leasing of Japanese Government land, and temporary rentals of private property have distinguished OED's leasehold programs in Okinawa.

Just as America's vital interests in using Marshallese lands for Nike testing have led POD to frequent conferences on lease terms in Kwajalein, so the U.S. determination to retain its military forces in Okinawa has presented the Division with many real estate negotiation tasks in the Ryukyus. The acquisition procedures described above were agreed to only in 1958. Prior to that year, the U.S. had promulgated several plans for acquiring fee titles or maximum interests in private lands, and in February 1957 USCAR had authorized single payment acquisition of a "determinable estate" interest in Okinawan land needed for an indefinite period. Local opposition to this program then resulted in the establishment of the indefinite and five-year leasehold plans. These programs have featured continuing annual rentals rather than fixed single payments and have thus been more favorable to private owners than were earlier schedules. The late 1950's also saw the establishment of the Joint American-Ryukyuan Land Advisory Committee, composed of four Okinawans, two Americans from USCAR, and two Americans from OED. Soon after its assignment to the Pacific Ocean Division, then, the Okinawa District found itself busy implementing

the provisions of a new real estate program and making recommendations to the HICOM on real estate matters in Okinawa.

The backlog of cases stemming from the new program effected in 1958 had not been the only cause of increased workloads during the past ten years. As a result of war-time and post-war relationships between the United States and Okinawa, and because the Ryukyus have remained an essential military base for the U.S., OED has become involved in both claims settlements and demands for increased rents. November 1960, for instance, saw the HICOM ask OED to settle private claims for rentals or damages which had occurred between 1 July 1950 and 28 April 1952, the period just prior to the signing of the U.S.-Japanese peace treaty. By July 1963 the District had reached agreement with the Ryukyuan representatives and had completed the \$3.8 million program of condemnation and payment. A second wave of claims settlement work began in October 1965, when the U.S. Congress authorized the payment of almost \$22 million as an *ex gratia* contribution to pay Ryukyuan claimants for personal injuries and property damages incident to U.S. armed forces activities between 15 August 1945 and 28 April 1952. The HICOM delegated the responsibility for real estate claims validations to OED. The District was also to handle all payments, including those for personal injury and deaths, validated by USCAR. Work on this Pre-Treaty Claims project began in January 1967, as OED hired 34 additional employees to cope with the huge volume of work. By the time the program was completed, in October 1968, the District had validated claims in the amount of \$17.7 million. Claims validation in Okinawa proved especially difficult, furthermore, because World War II had destroyed

many early land records.

Claims settlements arising out of earlier affairs in the Pacific have thus brought sudden increases to the Division's real estate workload in Okinawa. Revisions in rental rates have likewise reflected the delicate relationships between the U.S. and Okinawa and have also assigned additional work to OED's real estate staff. When the land rental rates were increased in 1968, for example, the total gross annual rental on U.S. leased land in the Ryukyus jumped 45% from \$6.9 million to \$10 million. OED had to modify a total of 560 leasehold documents in order to pay the land rentals for fiscal year 1969.<sup>3</sup>

The following year, a petition of almost 10,000 Ryukyuan landowners asked for an increase in the annual rental of approximately \$1.25 million. This request has occupied both OED's Office of Counsel and the District's Real Estate Division. Plans for the return of the Ryukyus to Japan have also added to OED's real estate activity, since the Chief of the District's Real Estate Division is acting for the District Engineer in several capacities so that OED can furnish real estate input for reversion negotiations. Plans for reversion, requests for higher rentals, and settlements of post-war claims all reflect America's interest in the Ryukyus and illustrate the influence of that interest on OED's real estate work. The islands' geographic limits have increased population density and enhanced land values; the Okinawan culture has underscored the native dependence on arable land and the consequent insistence on leasehold rather than fee acquisition; and the importance of the Ryukyus to American foreign policy has kept the District busy with property claims and fluctuating rentals.

Similar conditions of geography and culture have influenced the real estate trans-

actions of FED, whose responsibilities in this area have somewhat resembled those of OED. Just as OED has had real estate duties only in the Ryukyus and not in Taiwan, so FED has performed real estate functions only in Korea and not in Japan. FED received its real estate assignment for Korea on 1 July 1958, when the Eighth U.S. Army transferred certain operational functions of real estate to the Far East Engineer District. FED was to prepare and execute the appropriate real estate documents for the lands required by the Eighth U.S. Army. At the same time, FED began to coordinate its real estate efforts with the Ministry of National Defense (MND) of the Republic of Korea. The District has performed real estate services not only for U.S. military units in Korea but also for United Nations forces in ROK. All these operational responsibilities have been carried out under the policy guidance and supervision of the Commanding General of the Eighth U.S. Army.

Just as geographic and cultural features have affected real estate activity in other regions of the Pacific, so they have influenced real estate dealings in Korea. Since Korean tradition has never required accurate records of property ownership, first of all, FED's Real Estate Division soon became involved in metes and bounds surveys of U.S. Forces, Korea (USFK) installations. This survey program to determine current ownership for MND compensation took place in the mid-1960's and was carried out primarily via a contract with the R.M. Towill Corporation. Towill employed aerial photogrammetry to survey most of the installations; the total cost of the contract, paid in April 1967, was over \$172,000. FED's own Real Estate Division also used direct hire personnel to survey some off-island installations. Because of the lack of precise ownership records in

Korea, then, FED completed this extensive metes and bounds survey to provide accurate maps of U.S. holdings in Korea. This same feature of Korean culture also came up during 68-S construction, when FED had to obtain rights of way from individual owners for land needed for the 250-mile POL pipeline.

The lack of accurate records has thus influenced FED's real estate activities in Korea. Other features of culture and geography have led to native reluctance to relinquish property. Land is only slightly more plentiful on a peninsula than on an island, and Korea's mountainous countryside precludes farming in much of the Republic. The oriental attachment to the land has permeated Korean as well as Marshall-ese and Okinawan culture, too, and has reinforced the natives' determination to hold onto their property. This attitude has led to the same practice followed in Kwajalein and Okinawa: the U.S. leases private property in Korea and has handled no fee simple acquisitions there.

Here the similarities with the other Districts' real estate activities end, however, for United States forces pay no compensation for the use of this Korean Land. Thus the third major factor affecting POD's work, America's vital stake in certain Pacific regions, has clearly influenced real estate practices in FED. The provision of the 1952 Status of Forces Agreement which permitted the free use of Korean real estate by U.S. forces stemmed from America's determination not to pay for the use of lands in theaters of action. Further justifying the free use of Korean property is the arrangement under which American forces have been stationed in Korea. The U.S. has reasoned that, since it offers its military defense of Korea at the request of the ROK, in order to provide this aid it should maintain its forces on Korean

soil without rental charges. Unlike the situation in Kwajalein or in Okinawa, in Korea the U.S. does not compensate private owners for the use of their land.

This custom had led to frequent difficulties in actually obtaining the use of Korean property. Since 1957 the ROK Government has tried to reimburse private owners for their land, whether this property is taken for ROK use or leased for American forces. Since the U.S. does not provide any funds for this purpose, the Korean Government has tended to use its existing funds to pay first for land acquired for its own forces. Told by the Ministry of National Defense that it lacks the money to reimburse them for property requested by the U.S., then, private owners might understandably refuse to authorize the use of their land. ROK representatives have unsuccessfully petitioned the United States for funds for land acquisition. Like the Government of TTPI or GRI, then, ROK compensates private owners for their land; but unlike those Governments, the Government of Korea receives no real estate funds from the United States.

Thus the influence of American interests and policies in the Pacific has been seen clearly in the Division's real estate work in Korea. These interests were also reflected in the USFK decision in late 1969 to return all real estate functions in Korea to the Eighth U.S. Army. In relieving FED of its real estate mission in ROK, USFK considered overall American policy in that area as well as the presence and capabilities of EUSA. The eventual loss of the real estate responsibilities and the unusual situation whereby the U.S. acquires the use of Korean land without compensation have both revealed the effects of America's vital stake in the Pacific on POD's real estate in Korea.

In Korea as in Hawaii, Kwajalein, and

Okinawa, then, the geography of the area, the foreign background of the region, and the importance of the land to the United States have all shaped POD's real estate activity. Shortages of land in these insular and peninsular areas have created high property demands and values. Also contributing to the population's dependence on land have been certain economic and cultural patterns characteristic of all four regions. CONUS residents do not often surrender their property willingly, but in most cases those citizens will accept financial compensation for fee simple acquisitions. The situation has proven different in the far east, where land equals livelihood and self-esteem. There POD has dealt in leaseholds rather than in fee acquisition so that private owners might permit Federal use of their property while retaining title. Even in Hawaii, the oriental background of many immigrants has underscored the importance of private ownership of land in fee simple and has led to the frequent use of leaseholds by the U.S. government. In addition to these geographic and cultural factors, America's vital interests in the Pacific have affected real estate proceedings in all four regions. The stationing of so many military commands in Hawaii has created some local resentment, which has then required delicate negotiations and leaseholding rather than fee simple acquisitions. The large number of posts established on Oahu has also meant a heavy Hawaii workload for POD's real estate staff. America's plans to continue Nike research and development on Kwajalein, meanwhile, have encouraged U.S. efforts to renegotiate lease rentals with the Marshallese, while the presence of the U.S. Navy in TTPI has assigned POD an unusual role in real estate proceedings there. Relations between the United States and Okinawa

have resulted in extra real property claims settlements for OED. Similarly, the status of U.S. forces in Korea has led to a unique situation in which the United States uses Korean land without compensation.

Thus influenced by geography, non-American culture, and vital U.S. interests in the Pacific, the Division's real estate activity has reflected both the diversity and the challenge typical of POD's tasks. CONUS-like proceedings in Hawaii, work with the U.S. Navy in Kwajalein, claims settlements and rental rate revisions in Okinawa, and rent-free land use in Korea have contributed to a wide range of real property tasks. Supervising such diverse real estate activities in four different Pacific regions has provided POD with many challenges over the past ten years. The Division has balanced the needs of military commands in Hawaii with State and private interests. In Kwajalein, POD's real estate staff has worked with numerous agencies, including SAFSCOM, the Government of TTPI, and the American Navy. Real estate activities in Okinawa have called for an understanding of Japanese traditions and attention to claims generated over 20 years earlier. Managing real estate in Korea, meanwhile, POD has worked closely with the ROK Ministry of National Defense to obtain land needed for U.S. and U.N. forces.

This variety of real estate activities in Hawaii, Kwajalein, and the far east has made POD's work in that field quite interesting. In fact, the Division's diverse real estate programs epitomize the themes of variety and challenge which have characterized POD's first decade. As Part One has noted, with each of the three Districts assigned to POD in 1957 came a special history: HED had joined the Corps of Engineers in 1905; OED had helped to rebuild post-war Okinawa; and FED had begun

only the year before as KCA. The Division's activities during its first ten years have also reflected great variety. In 1959, for example, POD supervised the construction of the ZAR shielding fence at Kwajalein, the tribar rehabilitation of Nawiliwili's breakwater, the building of Zukeyama Dam on Okinawa, the repair of the locks at Inchon Basin, and the erection of extensive camp facilities at Chitose. Almost any other year has offered a similarly wide range of projects. 1966 saw Nike-Zeus facilities converted for use with Nike-X; small boat harbors studied in Hawaii; facilities enlarged at CCK and Kadena; water wells drilled in Korea; and barracks remodeled as hospitals in Japan. These tasks involved the Division simultaneously in dredging, paving, drilling, air-conditioning, and an assortment of other construction techniques.

Coping with these diverse projects as well as with the unusual circumstances described in Part Two has proven a challenge to POD. Environmental conditions have resulted in the management of many small civil works projects in Hawaii, for example, while other features of weather and climate have led to such interesting designs as the "clamshell" covers for Nike radars. Operating in foreign lands has challenged the Division to adopt some modified contracting procedures, to translate safety manuals, to consider several different supply methods for each job, and to make good use of TDY assignments and local national employment. POD's presence in regions vital to American defense has created similar challenges for the Division: tasks such as electric power generation and water well drilling, for instance, have introduced POD to unusual aspects of construction, while emergency programs like 66-S in Southeast Asia and 68-S in Korea have demanded great flexibility

within the Division. Because of the nature of construction in the Pacific Ocean, diversity and challenge have characterized the first decade of the history of POD.

## Chapter VII

1. U.S. Army Engineer District, Okinawa, "Summary of the U.S. Real Estate Program in the Ryukyu Islands," 1970.
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3. U.S. Army Engineer Division, Pacific Ocean, "Major Achievements: Pacific Ocean Division: November 68 - August 70."



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## **PACIFIC OCEAN DIVISION ENGINEERS**

Brigadier General Ellsworth I. Davis

June 1957 to July 1960

Major General Gerald E. Galloway

August 1960 to April 1962

Colonel Stephen S. Smith

May 1962 to March 1966

Colonel Walter L. Winegar

March 1966 to July 1967

Brigadier General Edward T. Podufaly

July 1967 to November 1968

Brigadier General Curtis W. Chapman, Jr.

November 1968 to August 1970

Brigadier General George B. Fink

August 1970

**HONOLULU DISTRICT ENGINEERS,  
1957-1970**

Lieutenant Colonel McGlachlin Hatch  
July 1957 to June 1959  
Colonel John R. Clifton  
June 1959 to June 1961  
Colonel Donald G. Williams  
June 1961 to July 1963  
Colonel Glenn P. Ingwersen  
July 1963 to June 1966  
Colonel William F. Roos  
June 1966 to August 1968  
Lieutenant Colonel C. S. Romedy, Jr.  
August 1968 to November 1968  
Colonel John A. Hughes  
November 1968 to October 1970

## **FAR EAST DISTRICT ENGINEERS**

Colonel Stephen E. Smith  
July 1957 to April 1958

Colonel Ellery W. Niles  
April 1958 to April 1959

Colonel Daniel A. Richards  
April 1959 to April 1960

Colonel Herschel E. Linn  
April 1960 to March 1961

Colonel William N. Beard  
March 1961 to May 1962

Colonel James G. Rawlings  
May 1962 to August 1962

Colonel Wilmot R. McCutchen  
August 1962 to August 1963

Colonel Robert E. Snetzer  
August 1963 to August 1965

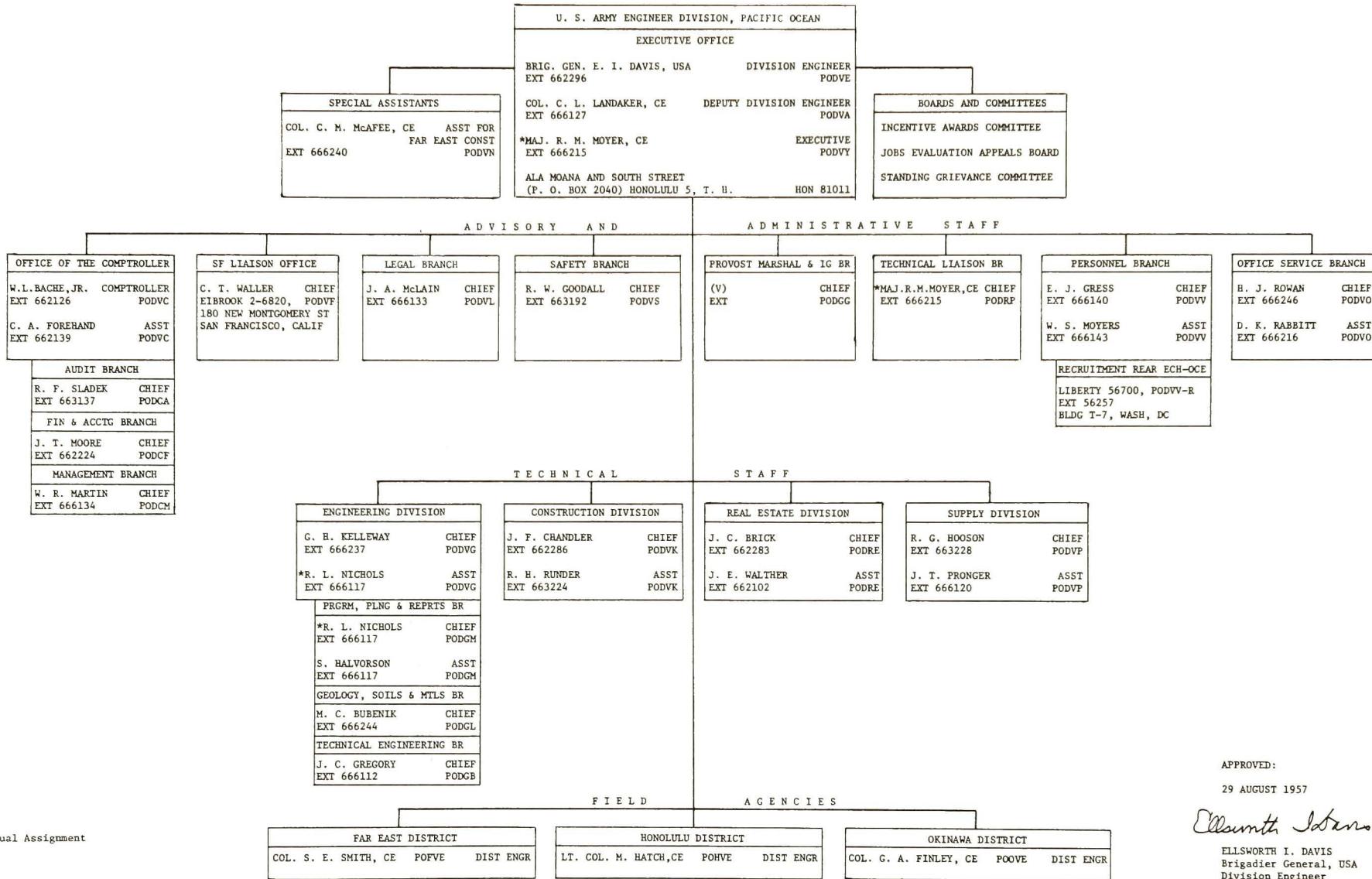
Colonel William M. Boardman  
August 1965 to July 1967

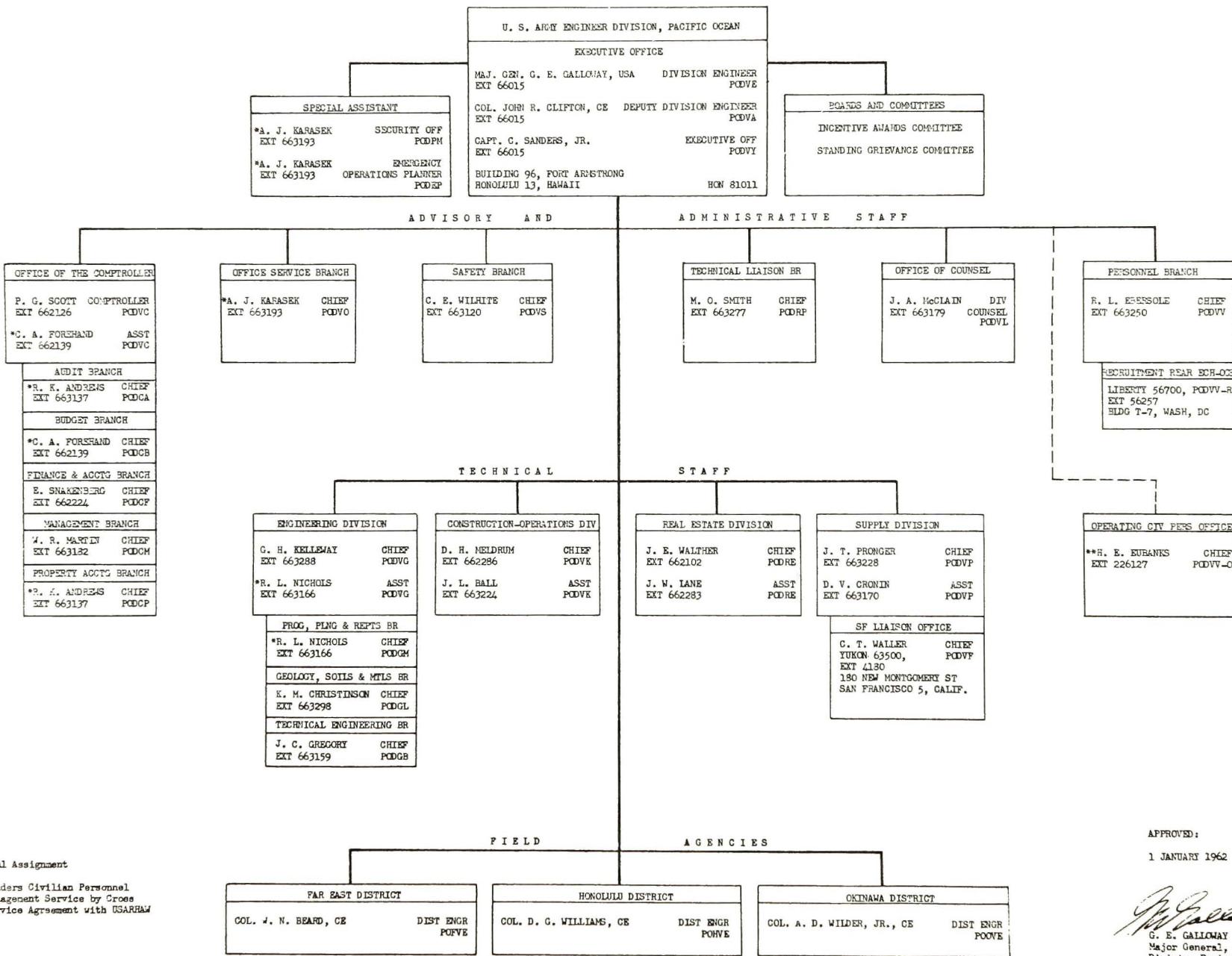
Colonel John J. McCulloch  
July 1967 to July 1969

Colonel Franklin R. Day  
July 1969 - June 1970

**OKINAWA DISTRICT ENGINEERS,  
1957-1970**

Colonel George A. Finley  
March 1956 to December 1957  
Colonel Claude P. Joyce, Jr. (Acting)  
December 1957 to January 1958  
Colonel Hamilton W. Fish  
January 1958 to June 1959  
Colonel Manon W. Whitsitt  
June 1959 to March 1961  
Colonel Alvin D. Wilder  
March 1961 to June 1962  
Lieutenant Colonel Elmer M. Regn  
(Acting)  
June 1962 to July 1962  
Colonel Henry C. Schrader  
July 1962 to August 1964  
Colonel Richard G. Rhodes  
August 1964 to July 1965  
Lieutenant Colonel Frank H. Armstrong  
(Acting)  
July 1965  
Colonel George A. Austin, Jr.  
July 1965 to August 1967  
Colonel Vernon T. Loesing  
August 1967 to June 1970  
Colonel Franklin R. Day  
June 1970



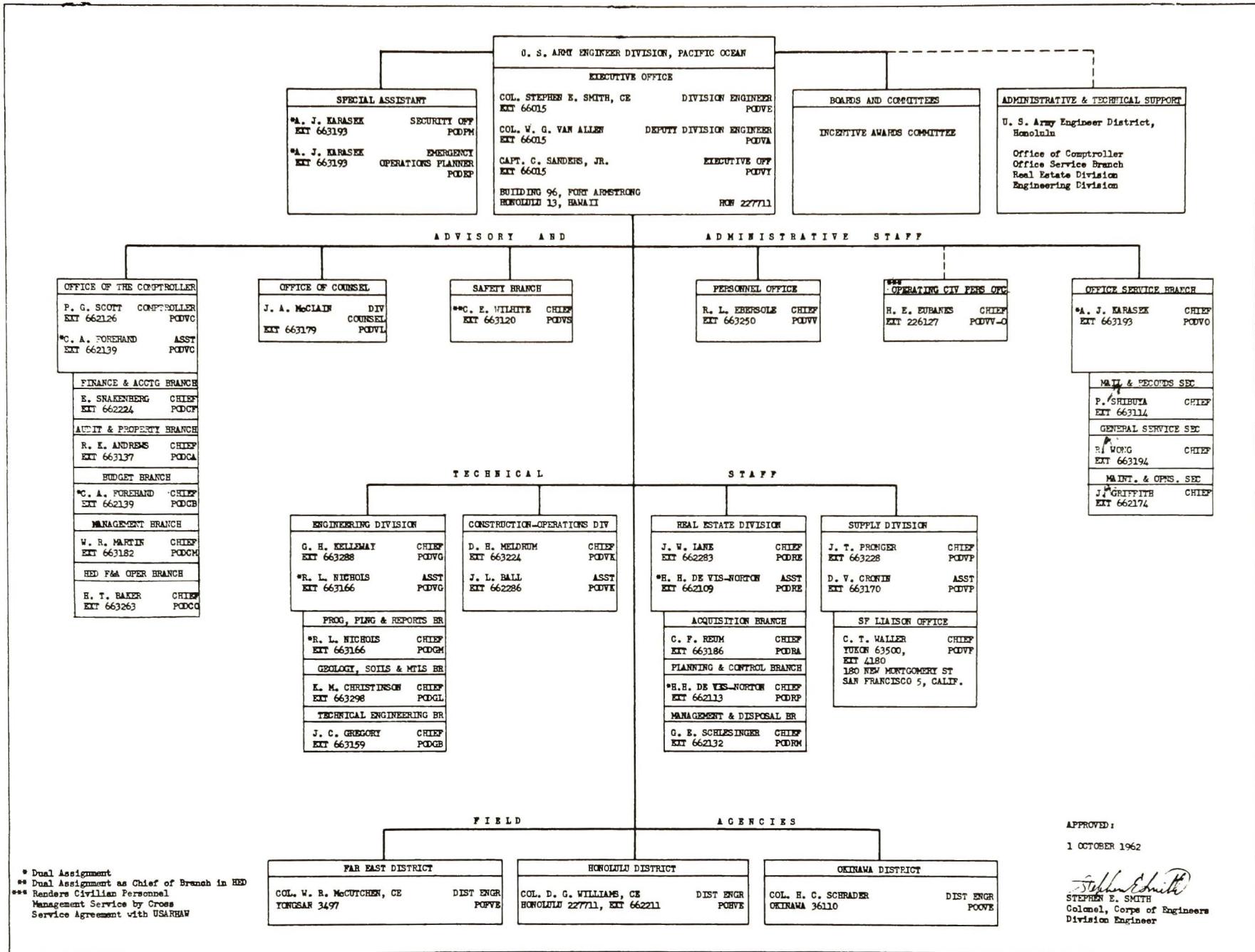


\* Dual Assignment

\*\* Renders Civilian Personnel Management Service by Cross Service Agreement with USARHAW

APPROVED:  
1 JANUARY 1962

*G. E. Galloway*  
G. E. GALLIGAY  
Major General, USA  
Division Engineer



\* Dual Assignment  
\*\* Dual Assignment as Chief of Branch in HED  
\*\*\* Renders Civilian Personnel  
Management Service by Cross  
Service Agreement with USARHAW

\*Dual Assignment  
\*\*Sends Civilian Personnel Management Service by Cross Service Agreement with USARHAW  
# EOD 13 Aug 67

OFFICE OF THE COMPTROLLER
C. A. FOREHAND COMPTROLLER 542-726 PODVC
FINANCE & ACCTG BR
E. SRAKNERBERG CHIEF 542-824 PODCP
AUDIT BRANCH
R. K. ANDREWS CHIEF 542-937 PODCA
BUDGET BRANCH
S. TEKETRA CHIEF 542-950 PODCB
MANAGEMENT BRANCH
J. L. ANDERSON CHIEF 542-982 PODCM
REC P&A OPS BR
D.G.D'AGOSTINO CHIEF 542-063 PODCO

OFFICE OF COUNSEL
E. L. ERICSSON DIVISION COUNSEL 542-979 PODVL

SAFETY OFFICE
#G. B. PHILLIPS CHIEF 542-879 PODVS

ENGINEERING DIVISION
R. L. NICHOLS CHIEF 542-088 PODVG
W. D. DARLING ASST 542-959 PODVG
PROG, PLNG & REPORTS BR
J. L. BALL CHIEF 542-966 PODGM
GEOLOGY, SOILS & MTLS BR
L. B. JONES CHIEF 542-098 PODGL
TECHNICAL ENGINEERING BR
W. D. DARLING CHIEF 542-959 PODGB

CONSTRUCTION-OPERATIONS DIV
*D. H. MELDRUM CHIEF 542-024 PODVK

## ADMINISTRATIVE STAFF

PERSONNEL OFFICE
D. A. LETTCH CHIEF 542-050 PODVV

OPERATING CIV PERS OFO
H. E. EUBANKS CHIEF 861-927 PODVV-O

OFFICE OF ADMIN SERVICES
G. W. BUSHER CHIEF 542-903 PODVO

MAIL & RECORDS BR
H. TAMATEI CHIEF 542-894
GENERAL SERVICE BR
R. A. WONG CHIEF 542-994
MAINT & OPS BRANCH
J. R. GRIFFITH CHIEF 542-040

TECHNICAL LIAISON OFFICE
* E. SMITH CHIEF 542-315 PODTL

## TECHNICAL

## STAFF

REAL ESTATE DIVISION
*H. H. DE VIS-NORTON CHIEF 542-883 PODRE

SUPPLY DIVISION
C. T. WALLER CHIEF 542-028 PODVP

SF LIAISON OFFICE
L. Q. C. LAMAR CHIEF 556-2374 AREA CODE 415 100 MCALLISTER STREET SAN FRAN., CALIF 94102

## DISTRICT

## OFFICES

FAR EAST DISTRICT
LTC J. J. McCULLOCH DISTRICT ENGINEER YONGSAN 3497 PODVE

HONOLULU DISTRICT
COL W. F. ROOS DISTRICT ENGINEER HONOLULU 542-811 PODVE AREA CODE 808

OKINAWA DISTRICT
COL G. A. AUSTIN, JR. DISTRICT ENGINEER OKINAWA 36110 PODVE

APPROVED:  
1 AUGUST 1967

*Edward T. Podufaly*  
EDWARD T. PODUFALY  
Brigadier General, USA  
Division Engineer

## US ARMY ENGINEER DIVISION, PACIFIC OCEAN

